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RICHARD P. ROTHWELL, C.E, M.E., Editor.

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THE Tariff bill as reported by the Committee of Ways and Means is full of interest for the mining and metallurgical industries of the country, but as it is certain to be changed more or less in its passage through Congress and will possibly never become law, it is hardly necessary to discuss it at present. The New England iron industry will be disappointed at receiving no relief, the copper miners will consider that a serious blow has been struck at their interests by the reduction of the duty on copper by one half, the lead ore miners will be jubilant at the additional protection they are to benefit by, and the prospective tin plate manufacturers must be already gloating over their anticipated profits.

DURING the week the important coal industry of England has been paralyzed by the commencement of a strike that was unprecedented in its magnitude, involving, according to some authorities, nearly 400,000 men. Great and widespread mischief to many other industries has been caused by the partial suspension, for one week, of the fuel supply, more acutely felt, of course, because of the general manufacturing activity; but we are glad to say that the strike has ended. A conference of delegates representing the coal mine owners and the miners was held in Westminster on Thursday, at which it was agreed to make an immediate advance of 5 per cent. in the wages of the miners, and a further advance of 5 per cent. on July 1st. The men will resume work immediately. Arrangements for dealing with questions of wages in the future were agreed upon in principle.

A NEW mining act has been passed by the Government of the Province of Ontario, Canada, which should tend to the encouragement of mining. The law reads as follows:

1. Any person discovering mineral on any crown lands may obtain a mining claim of 40 or 80 acres by staking it out and paying a registration fee of $5 in the local land office.
2. He can then hold the claim for six months by working it, and when he has expended from $150 to $200 in proving it up he can get the patent for it at $2 an acre.
3. Any one discoverer of new mines or deposits of ore shall be entitled to hold three claims on these terms at the same time; a party of three, five claims and a party of five, or a joint stock company, seven claims.
4. Severe penalties are provided for removing stakes or otherwise interfering with another person's claim.

These provisions are fair and give the poor prospector a chance.

THE salt industry of Kansas promises to be one of considerable importance. It is practically a new enterprise, and yet the showing for what was the first year of active operations indicates that Michigan, New York, West Virginia, Ohio, and Louisiana may have a formidable competitor, at least in the territory within which freights will have a commanding influence upon markets.

Of the seventeen producing companies reported in 1889, only a single one, a small plant in Kingman County which yielded but 275 tons in 1889, produced any salt before 1888. In the calendar year 1889 the total output was 547,224 barrels and 19,056 tons in bulk, and was valued at $448,238 spot. The production came from four counties, Anthony, Hutchinson, Kingman and Wellington, the second named furnishing the largest yield.

RECENT foreign correspondence states that the Russian government has decided to push vigorously the construction of the proposed railroad across Siberia. General Annenkoff, the builder of the Trans-Caspian road, reckons that the entire line to Vladivostock will cost less than $200,000,000, and that through trains can be run from the Baltic to the Pacific within five years from the beginning of construction. The quickest route for globe trotters to take in going around the world would probably be by Canadian Pacific from Vancouver to Halifax, or preferably to Louisburg, Cape Breton, should the railroad be extended to that port, as has been proposed, by steamer to Havre, thence by rail to Vladivostock, and by Pacific steamer to Vancouver. The development of Siberia by a transcontinental railroad would be of vast importance to the civilization of the world.

ONE cause of the enormous consumption of iron and steel which is now taking place in this country, is the great number of huge office buildings which are being erected in all our large cities. Attention is called in *Architecture and Building* to the fact that these buildings are not what they seem. To the ordinary beholder they are built of stone, brick, terra cotta and glass, but, in fact, the entire skeleton is of iron or steel, and all other materials are merely masks with which to clothe the monster. The building is constructed on the principle of a latticed girder or braced tower. The brick or stone-work shown is a mere shell or architectural veneer, to give the building a resemblance to its neighbors. As we are apparently only at the beginning of this new era in architecture, it is probable that the demand for iron and steel for these monstrous buildings will continue at an increasing rate.

Mr. C. J. NORWOOD, inspector of mines of the State of Kentucky, in his last annual report speaks well of the working of the amended State mining law requiring artificial ventilation in coal mines, in place of "natural" ventilation, which the law formerly permitted. After an experience of eighteen months under the new regulation, he finds the condition of the mines to be greatly improved by this compulsory substitution of artificial for natural draft. The Kentucky coal mines, it is true, do not present the same difficulties in regard to ventilation as those of Pennsylvania and Ohio for example; but even with the simpler and less extensive openings the change has been proved to be a very useful one. It is manifestly absurd for an inspector to inquire into the details for the direction and distribution of a current if there is no current to distribute—and this is very often the case where mines are said to be ventilated naturally, the term being a convenient cover under which to practice a pennywise saving of the cost of apparatus and running it, while foul air or dangerous gas mixtures may accumulate. With compulsory artificial ventilation the inspector can at once proceed to the examination of such details as the proper distribution of air to the diggers in the rooms as well as in the different districts of the mine, leakages of foul air from old workings, the wholesomeness of the air sent into the various entries, the supply of fresh air to miners driving entries or engaged in dead work, and the control of gas feeders. With an actual current to handle, there is some sense in determining how best to manage it, and the official inspection and control become then something more than a perfunctory form.

PETROLEUM TRANSPORT IN BULK.

The first tank steamers for carrying petroleum appeared on the Caspian Sea about ten years ago. In 1883 Mr. CHARLES MARVIN, on visiting Baku, found nearly forty of them, nearly all of which had been built in Sweden, running with oil to the Volga. He then advocated the system for the ocean carrying trade. But it was some time before it was considered feasible to construct ocean steamers for the express purpose of conveying petroleum in bulk, though, looking backward now, it seems remarkable that they were not adopted in the first place, or at least as soon as the petroleum carrying trade was sufficient to offer constant employment for vessels especially designed for the purpose, and which could not readily be altered for carrying other cargoes in case of a falling off in the petroleum movement. There certainly were no great constructive difficulties involved. The first Atlantic steamer of this class was built in England in 1886, but sailed under the German flag. There are now over sixty specially built or converted steamers running on the Atlantic and Mediterranean for conveying petroleum in bulk. The proportion of oil thus carried, to that transported in barrels, has been steadily increasing. Thus, Mr. MARVIN, in reviewing this branch of the petroleum trade, states that about four times as much oil is now conveyed in bulk as in barrels. During the first nine months of 1889 no less than 785,896 barrelfuls of oil arrived at the principal ports of the United Kingdom in tank steamers, as compared with 635,650 barrelfuls in wood, while four continental ports, Hamburg, Bremen, Antwerp and Rotterdam, received during the same time, 2,405,-029 barrelfuls in bulk, as against 695,024 barrelfuls in wood. Perhaps the proportion is placed too high, but it will soon be reached.

The economical handling of petroleum in large quantities has reached a high stage of perfection, and it is one of the most striking illustrations of what inventive ability can accomplish whenever the motive is sufficient to call it forth. Thus, in a comparatively short time, the means of moving and storing petroleum on land, and transporting it by sea, have been developed with great rapidity and success. The vast systems of pipe lines, pumping plants, storage reservoirs, etc., to say nothing of the railroad tank cars and the bulk-carrying steamers, show how readily mechanical progress lends itself to economic conditions whenever great industries spring up.

There are other commodities, the transport of which in bulk means similar saving of time and expense, and for which there is room for much improvement in transportation facilities. Notwithstanding the great mechanical perfection of the grain elevators, for instance, and the ease with which vast quantities of grain are loaded and unloaded from and to cars and vessels, the transportation of grain in bulk at sea is yet in an imperfect stage, and is maintained under disadvantages of cargo shifting, wetting and deterioration, or sometimes swelling to a degree endangering the vessel. Perhaps the system of steel shells already experimented with on the lakes may solve the difficulty. The grain fleet carries return cargoes of altogether different character, and hence, if specially adapted for bulk cargoes of grain, the ships are not so well fitted for other work. Yet here is an opening for invention. Another field for improvement is in the movement of lumber by sea, the giant rafts thus far constructed having been only partially successful. Even in handling coal, iron ore and similar bulk cargoes, there is much to be desired. Vessels carrying such materials are loaded from specially equipped shipping docks with great ease and rapidity—the trouble comes at the other end when the unloading begins. In all these, and in the case of many other commodities, there is a large margin for cutting down the cost of handling. No doubt, with the growth of the various productive industries, there will be more and more specialization in the means of transport, such means being devised with reference to the particular class of goods to be handled. But so far, taken altogether, the system of storing and moving petroleum is about the best example of the kind.

COMMERCIAL ECONOMY.

The conditions of industry may be divided, in general terms, into natural and artificial, though it would be difficult to draw the line sharply or to produce instances of either class entirely free from the influence of the other. For the purpose of this paper, however, the rough distinction may be useful as a basis for some observations which, I trust, may be of value, especially to the younger members of the mining and metallurgical professions. Under the head of natural conditions I would include those which are furnished by the material environment of an enterprise and the principles of physical science applicable to it. The artificial conditions, on the other hand, are those which the laws, customs, prejudices, fashions and established institutions of man impose. The two classes contribute jointly to the complex conception of value in political economy, and the complex result of success in business undertakings. But it cannot be denied that, while natural conditions are sure to be felt in the long run, artificial conditions are usually more immediately decisive, and sometimes seem to win a permanent victory. The conflict between them is simply the old conflict between theory and practice, or rather between the too narrow theory which is based on natural conditions alone, and the practice which gives greater weight to artificial conditions. For no doubt a true theory, embracing not only nature, but also human nature, and taking account of historical as well as present forces, would correctly formulate the problems of industry. But the formula would contain too many variable and unknown quantities to be generally useful.

A familiar illustration is furnished by the decimal system of notation. As I observed in a recent communication, no one denies that natural conditions favor *eight*, for instance, rather than *ten*, as the basis of notation. The nuisance of fractions would be largely reduced if eight had been adopted. But savages happened to count their thumbs as well as their fingers; and on the decimal base thus firmly fixed in the habits of men the Arabic system—a beautiful structure on a false foundation—was built. Natural conditions still make themselves felt. They lie, indeed, at the bottom of a large part of the difficulty encountered in the effort to extend the use of the metric standards of weight and measure. But artificial conditions are so much stronger that the scientific men of to-day are earnestly advocating (and with justice) the universal adoption of a fundamentally unscientific system. For no one dreams of digging up the decimal basis, to confer a better one upon the world.

The gauge of our railroads furnishes another example. It is certain that the width of 4 ft. 8½ in. sets a limit to economy in the use of fuel for locomotives, by limiting the space in which it can be burned. Brunel was probably right in believing, as he did to the day of his death, that the most economical gauge was a wide one—perhaps even as wide as 7 ft. But we have seen thousands of miles of railway transformed to the 4 ft. 8½ in. gauge, all because that was the width of certain wagons, adapted for use on the earliest steam railroad, and became a fashion too strong to be resisted. Uniformity of gauge was found under artificial conditions to be more important than ideal perfection based on natural conditions; and scientific gave way to business considerations.

Similar illustrations are offered in abundance by every branch of modern industry, particularly in these days of machine-made, interchangeable parts. The fact that a watch or a locomotive can be cheaply made and easily repaired, because it is one of a large number, all made alike, confers upon it a superiority quite aside from its intrinsic excellence; while, at the same time, a certain guaranty of high, if not the highest, quality is afforded by the fact of such general use.

The habits and fashions of trade, also, constitute conditions against which the inventors of even valuable improvements often struggle in vain. Purchasers of machinery cannot afford to make new patterns, though they might prefer such; and makers, on the other hand, do not throw away old patterns until competition forces them to do so. Nor does any manufacturer feel inclined to introduce a new thing, if his rivals can at once imitate it, and gain the subsequent advantage, without the initial risk and cost. This is, as we all know, the great use of our liberal patent laws, which grant for a limited period an absolute monopoly of new improvements. Without the ability to offer, if necessary, such an inducement to the capitalist, the inventor might seek in vain the means to make his happy discovery or device useful. This patent-protection is one of the principal artificial conditions affecting industry. I have not the least doubt that its benefit to the community greatly outweighs its incidental inconveniences or hardships. And I believe, moreover, that the monopoly granted should have no limit, except that of time. To require that a patentee should license all applicants, or that he or his licensees should adequately supply the market—in other words, to detract from the fullness of the monopoly granted him—would greatly diminish, and, in some instances, entirely destroy the beneficial effects of the patent law.

But, without pursuing this thought further, I wish to indicate a curious result of the extension of railways, profoundly affecting the interests of many, if not all patentees. I refer to the practical obliteration of territorial divisions, and the consequent loss of value of "territorial rights" granted by patentees. A few years ago the manufacturer of a new machine or the operator of a new process was quite content with the protection afforded by an exclusive right for a given State, or even county. Now there is in many cases no protection at all in such boundary lines. A competitor in a distant county or State may be as dangerous as if he were a next door neighbor. Patentees are more and more obliged to sell exclusive manufacturing rights for specified lines of wares rather than for limited territories. And for these lines of wares the monopoly is required to be absolute in order to compensate the licensee for the great labor and cost of advertising, experimenting, intriguing, warranting, bargaining, drumming, etc., and the not inconsiderable risk of failing to break down, even with the best of natural advantages, the artificial barriers of trade.

Considerations of this kind enter into what I have called the question of commercial, as distinguished from technical, economy. This sort of economy is not taught in our technical schools, and this is the reason that their graduates are not competent at once to solve the problems of practice or assume the responsibilities of management. I do not consider the

omission a defect in our technical education. On the contrary, the attempts sometimes made to supply it appear to me to be a waste of time which could be better employed. It is indispensable that the student should know the existence and the general nature of trade conditions as affecting, even controlling, the conclusions of science, and constituting a separate art, to be learned in actual experience. But feeble endeavors to teach it to him prematurely do little good, and may do much harm.

The true principle, I think, is to impart in the school what the active practice of life will need, but cannot give, and not to sacrifice this benefit in futile efforts to forestall experience, by loading the student with a mass of misunderstood misinformation, of which, for the most part, he must afterwards rid himself. Not seldom, I hear the complaint that young engineers are told by the school professors, at great length, all about methods now obsolete, and little about those which could be profitably used to-day. That the principles and practice of the present state of an art should be thoroughly taught, is, of course, true, and any deficiency on that side ought to be corrected. But the knowledge of its history is, of the two knowledges, perhaps the more fundamentally important, for that can scarcely be got after the years of study are over. Its practical use no one can doubt who has seen experts in present mining and metallurgy experimenting upon methods long ago wrought out by the ancients.

There is work enough for our technical schools in teaching the mathematical, chemical and physical laws that underlie all the scientific professions; in training the student in methods of study and experiment; in imparting a practical acquaintance with tools and instruments, laboratory and field-work, construction and design. So far as commercial economy is concerned, let them be satisfied, in the main, with the constant declaration that there is such a thing, and the general explanation of its character and importance.

Young graduates sometimes act as if commercial economy did not exist, but more frequently as if they knew all about it. One error is no worse than the other. Either gives rise to disasters which reflect discredit upon the profession, and are too often thrown up against the technical schools. According to my experience, they are generally the result of the rash assumption by inexperienced men of a confidence which experience only should give. Reports on mining property present perhaps the worst class of cases; but unwise recommendations of metallurgical processes are nearly as frequent and unfortunate.

Nevertheless, the technical schools are steadily turning out the graduates from among whom, by natural selection, are taken the successful managers. The foremost of these are sure to be those who have added an acquired acquaintance with commercial economy to a thorough understanding of technical economy; who trade profit ably, because they know exactly what they have to trade with. They neglect neither the balance-sheet nor the laboratory ; neither the price of fuel nor the duty of the engine ; neither the habits and preferences of men nor the properties of matter.

For natural conditions will tell. No railroad agreements will destroy the advantage of a down grade ; no trade combination will permanently exclude from use the thing that is cheapest, and best, too; no commercial facilities will supersede the metallurgical necessity of a correctly composed slag. The habits and preferences of men change continually, the properties of matter, never, and the pressure of natural conditions is perpetually omnipresent, like the pressure of the almosphere. Foolish is he who expects them to be immediately triumphant; not less foolish he who ignores their power, and frames his enterprises upon an artificial foundation that does not include them.—R. W. R.

NEW PUBLICATIONS.

PALLISER'S COURT HOUSES, CITY HALLS, JAILS, ETC. Prepared by PALLISER, PALLISER & CO., New York. Published by J. S. Ogilvie, New York, 1889. Paper, 4to, 96 pp.; illustrated with working diagrams and heliotype views. Price $1. Subscription for quarterly series, one year, $3.

This publication gives designs made by the authors in the course of their regular architectural work, and includes working plans, detail drawings, perspective views and specifications for a variety of public buildings in small towns and villages. It should serve as a useful guide for public officers, commissions and boards in charge of the erection of such buildings, as it gives very minute specifications in some typical cases, which would serve as a basis for estimating costs for various sizes, designs and materials. Some of the designs are very artistic, and the plans appear to have been carefully worked out. The value of the book would have been increased by the insertion of more descriptive text.

IRON MINES AND IRON ORE DISTRICTS IN THE STATE OF NEW YORK. Bulletin No. 7 of the New York State Museum. By JOHN C. SMOCK. Printed for the Museum, Albany, 1889. Paper, 4to, 70 pp., with map.

In this bulletin Professor Smock gives the results of field work and correspondence carried on in 1888. Visits to most of the mines and responses to letters of inquiry have elicited much information, which is not especially new, but is here brought together in convenient shape. The author first describes the iron ore districts in general, explaining their geographical and geological features, and then proceeds to give brief notes on the individual mines. His classification of the New York iron ore deposits is as follows :

1. The Highlands of the Hudson—magnetic iron ores.
2. The Adirondack region, including the Lake Champlain mines—magnetic iron ores.
3. The hematites of Jefferson and St. Lawrence counties.
4. The Clinton or fossil ores.
5. The limonites of Dutchess and Columbia counties.
6. The limonites of Staten Island.
7. The carbonate ores of the Hudson River.

Besides these there are a few isolated mines. The leading mines of the Champlain district and the Tilly Foster have been described in detail in the ENGINEERING AND MINING JOURNAL from time to time. Some of the analyses quoted are a little misleading, being of best samples rather than of run of mine or of regular shipments. But the notes will be found valuable, and they have been prepared for the use of the general public as well as for the mining community. Altogether the bulletin presents in Professor Smock's usual conscientious manner a fair general view of the iron ore deposits of the State, though confessedly far from complete in point of detail.

A TEXT-BOOK ON ROOFS AND BRIDGES. Part II.: Graphic Statics. By MANSFIELD MERRIMAN and HENRY S. JACOBY. Published by John Wiley & Sons, New York, 1890. Cloth, vii. + 124 pp.; 4 plates and many diagrams; interleaved. Price, $2.50.

This is the second volume of a series of four, embodying the course of instruction in roofs and bridges given to the students of civil engineering at Lehigh University. It is an analysis of stresses by graphic methods. In the regular course it is preceded by the computation of stresses in roof trusses and the common types of bridge trusses, and followed by bridge designing and the discussion of cantilever, suspension, continuous and arched bridges.

The graphic method of analysis and presentation is one to which increased attention is being given in all branches of engineering, and is especially well developed by the present authors. Professor Merriman, in the preface, gives credit to his colleague, Mr. Jacoby, for the abbreviated processes employed in some of the diagrams for wind stresses, for the determination of stresses due to initial tension, and for portions of the analysis of maximum moments and shears under locomotive loads—these being points of novelty and practical value. Mr. Jacoby also furnishes the larger part of the text and diagrams.

In the first 32 pages principles and methods are discussed, the arrangement of sub-topics leading up naturally and progressively, and containing, among other matters, a short description of the graphical arithmetic to be used. Chapter II. deals with roof trusses, and Chapter III. with bridge trusses. The book is interleaved throughout with blank leaves alternating with the printed sheets, giving space to record, in permanent form, the preparatory numerical computations and to insert freehand sketches. This is a good feature, which might, perhaps, be improved upon by the addition of a few sheets of cross-section paper.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.
All letters should be addressed to the MANAGING EDITOR.
We do not hold ourselves responsible for the opinions expressed by correspondents.

West Kootanie, British Columbia.

EDITOR ENGINEERING AND MINING JOURNAL :

SIR: While thanking Prof. G. M. Dawson for his courteous remarks on my paper on the mineral resources of the West Kootanie country, I beg distinctly to state that in writing this paper I had no intention whatever of criticising either the value or the amount of work done by the Canadian Geological Corps. British Columbia—to say nothing of the whole of Canada—is a very extensive tract of country, so that it is impossible for any corps of workers to do more than keep pace with the most important discoveries of the prospector. My reference to the catalogue of 1886 was for the purpose of showing that, at that recent date, practically nothing was known of the mineral wealth of the district in question. Good float rock was discovered by chance in the Nelson district in the fall of 1886, but the first claim was not located till June, 1887. I am all the more pleased, therefore, to find that the geology of this district has already received attention at the hands of the Survey and that the results of their labor will soon be made public to the world.

BUTTE CITY, Mont., March 13th, 1890. GEO. E. R. ELLIS.

P. S.—Recent development has shown 14 feet of ore at the bottom of the Silver King winze, and 1,800 to 2,000 ounces silver ore on the Cottonwood Creek, near Warm Springs Camp.

Mining in Sonora, Mexico.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: The particular form in which mining is being absolutely ruined at present in Mexico is under the name of "Concesssion." Such are numerous in Sonora, and there is but one *Concessionaire* who has either the means or willingness to comply in any way with the terms of his concession; that one is the Mulatos.

These concessions generally cover 100 to 150 square miles, and are supposed to cost the *Concessionaire* about $3,000 each.

While some of them may have a value, I doubt if there is any of much value in Sonora excepting the one above named. The parties holding them hope that either Mexicans or foreigners will prospect and find a mine of value, and then the *Concessionaire* will get half. This is just what neither Mexicans nor foreign prospectors will do, and if a Mexican finds anything, he covers it up to wait for an abrogation of the concession. No man will prospect for a mine where he must give up half of it, and then have no title to any part.

A concession covering the San Ricardo is being manipulated to put in the San Ricardo at $225,000, and thus, by a fraud, comply with the terms of the concession. A similar scheme is attempted at Minas Prietas. At La Barranca the scheme seems to be to wait for some of the mines of value there, to lapse, and then to claim them and sell out to foreigners. So far as Sonora is concerned, I do not think there is a single case where a Mexican is now, or has been, putting money in to develop a property as is constantly done in the United States and

Canada. If there is any ore in sight, they promptly gouge it out, and then ask a price based on what they have taken out. To make a short story of this concession business, it has effectually put a stop to all prospecting or opening of any mines on the territory covered by the concessions, and this comprises nearly all the good camps in the State of Sonora, and the concession owners are not doing anything to comply with the terms of their contracts.

At Hermosillo I procured a span of mules and a buck board, and with a Mexican attendant from Chihuahua started East, going via Torres, Chivate, to San Marcial. I described this country in my letter published February 15th in your JOURNAL. Before and at San Marcial I made the investigation of coal. This is claimed under eleven zones or concessions covering 573 square leagues, or a tract of country, say, 100 miles east and west, by 40 to 50 miles north and south. These concessions were issued some 10 years ago and the terms never complied with, but have constantly been extended by Federal and State authority, because, as the managers state, the chief Federal and State authorities are personally interested. How this may be I cannot say. Whether these concessions are good will be a legal question to be settled some time in the future by numerous lawsuits. It seems they claim that Spanish laws on coal in Spain, made 100 years ago, did not apply to the colonies, and hence before 1883 the coal did not belong to or go with the land. Still a portion of this land was granted by the King of Spain 150 to 200 years ago, and it is not to be supposed that when the time arrives for a fight these claimants will sit down and not contest their rights.

From Hermosillo to San Marcial the country gives very little signs of containing any considerable amount of coal. The distance is somewhat over 80 miles. The original stratification is broken through by numerous volcanic peaks, and in several places the rocks are tilted up so that if there were coal to any amount, it would certainly show. There are a few places where a black slate appears, but neither above nor below it did I find coal. Whatever coal there is in Sonora is overlaid with conglomerate of from 500 to more than 1,000 feet in thickness, formed of both angular and round or water-worn fragments of granite, syenite and volcanic material, in some places cemented with lime, but often apparently by a partial fusion of its own material. This in some portions of Sahuaripa, east of or beyond the concessions, resembles that in the vicinity of Scranton, Pa., and in some portions of Colorado and Eastern Utah. The showing of this conglomerate is generally faint in the vicinity of San Marcial and west.

I went first nine miles east of San Marcial. In one place there is some argillaceous black slate, but no signs of coal otherwise. Another place, a mile distant, there was a vein four feet thick set up on edge, consisting of some plumbago with other materials, a small portion of which was calc spar, utterly worthless. Some other places in the vicinity showed thin streaks of slate. Six miles southwest of San Marcial there are other similar showings. Some two miles up the Matape River, and in an arroyo a mile back from the river, was by far the best showing I have seen in this location. There are two veins, each some 20 inches thick, that may have contained some coal, but were destroyed by volcanic heat, so far as coal is concerned. A little farther down the arroyo a well was dug some 25 feet deep. In this were cut thin streaks of what was coal, but volcanic heat had entirely destroyed its burning qualities. I followed from the San Marcial valleys to Tecoripa, 30 miles northeast, and thence east by north to Santa Barbara, at which place the country is all granite and volcanic, containing, of course, no coal. There are no signs of coal from San Marcial to Tecoripa. A month later I met an English expert looking over the same coalfield, but he was hardly in a condition to do much prospecting or make anything of a report.

I am quite at a loss to understand how so-called business men, Eastern or English mine buyers, send out so many mining engineers as they do, whose only work seems to be to sample the whiskey shops instead of the mines.

The old San Marcial mine, which cut so prominent a figure in San Francisco 15 to 20 years ago, was worked down to over 900 feet, and the ore becoming more refractory, work was abandoned twelve years ago. Since then everything at the mine except the hoisting drums has vanished. At the mill by the river utter desolation and ruin have taken possession, until even the little machinery left is worthless.

While I am not fully prepared to say that coal will not be found at or in the vicinity of San Marcial or Tecoripa, I am of the opinion that if found, it will be at great depth and then in thin seams. Just what its quality will then be, would be hazardous to say. It will probably be necessary to bore or sink a shaft of from 500 to even 1,000 feet to determine it with any certainty.

BRAD BARNER, M. E.

HERMOSILLO, Sonora, March 1st, 1890.

FOREIGN COMMERCE OF THE UNITED STATES.

From the report of the Chief of the Bureau of Statistics of the Treasury Department we obtain the following totals and comparisons:

The value of our foreign commerce, including imports, exports, and in-transit trade during the last fiscal year (ending June 30, 1889) was $1,582,339,533, as against $1,486,598,039 in 1888, an increase of $95,741,494.

The value of our imports of merchandise amounted $745,131,652, and of exports to $742,401,375; an excess of imports over exports of $2,730,277.

Of our exports, the value of domestic merchandise was $730,282,609, and the value of foreign merchandise $12,118,766.

Comparing the values of our foreign commerce of the last fiscal year with those of 1888, we observe, among other changes, the following as the most marked: The total value of imports and exports of merchandise was $1,487,533,027, as against $1,419,911,621 during the fiscal year 1888, an increase of $67,621,406.

The value of imports of merchandise amounted to $745,131,652, as against $723,957,114 during the fiscal year 1888; an increase of $21,174,538.

The exports of merchandise amounted to $742,401,365, as against $695,954,507 during the fiscal year 1888; an increase of $46,446,868.

The value of our in-transit trade during the fiscal year was $47,403,253 inwards and the same amount outwards as against $33,342,209 during the preceding fiscal year; an increase of $14,061,044.

The value of exports of merchandise during the last fiscal year was larger than during any year since 1883, and was only exceeded by the exports of 1880, 1881, 1882 and 1883. The value of imports of merchandise during the last fiscal year was the largest in the history of our commerce, being larger than in the year 1882, when it amounted to $724,639,574.

During each of the years from 1876 to 1887, inclusive, there was an excess of exports over imports of merchandise, the yearly average for that period being $134,388,312, and amounting in 1881 to $259,712,718. During the fiscal year 1888, the value of imports of merchandise exceeded that of exports $28,002,607, but during the last fiscal year only $2,730,277.

The value of our imports and exports of merchandise reached its highest point in 1881, when it amounted to $1,545,000,000; it declined to $1,314,900,000 in 1886, but has increased to $1,487,533,027 in 1889.

NOTES ON THE OCCURRENCE OF CHARCOAL AT A DEPTH OF 630 FEET IN THE SILVER CLIFF MINING DISTRICT, CUSTER CO., COLO.

Written for the Engineering and Mining Journal by Thomas Charlton, M. E.

The mines of the Silver Cliff mining district are mostly in a vast sheet of eruptive rock, which covers an area of about ten miles by six. This sheet of eruptive matter consists in the main of a gray and pinkish colored rhyolite. In consequence of the almost entire absence of fissure veins in this district, mining has been carried on for years in mere surface workings. Holes have been dug by the hundreds in every direction, but very few of them have attained a greater depth than twenty to forty feet from the surface, and none until recently in the immediate neighborhood of Silver Cliff to more than one hundred feet. Consequently but little could be known regarding the geological structure of this interesting section of country. Recently, however, deeper mining has been considered expedient in this section, and now one mine, the Geyser, has attained a depth of six hundred and thirty feet, with the result of having penetrated entirely through the rhyolite, and to a considerable distance beyond into the sedimentary rocks upon which the rhyolite is found to repose. Of what age, geologically speaking, these sedimentary rocks may be, is very uncertain, the material now on hand being by far too meagre to allow of the identification of these strata. Recently there has come into my possession slabs of rock from the Geyser mine from a depth of six hundred and thirty feet, upon which are beautifully preserved the ripple marks of the waters in which these strata were deposited. Also granite pebbles, worn smooth and round by the agitation of the same waters which left their ripplings indelibly impressed upon the rocks now being penetrated. But more interesting still is the fact that along with the ripple marks and granite pebbles are found fragments of charcoal, and small pieces of what seems to be anthracite coal. The fragments of charcoal vary in size from small grains, barely visible to the naked eye, to pieces two or three inches in diameter, and which are not mineralized to any perceptible extent, and which still retain distinctly the woody structure. Some of the charcoal found is black, quite soft, dull and lustreless, and soils the fingers slightly.

Other pieces are of a deep black color, quite dense, and somewhat hard, and have a brilliant lustre resembling anthracite. The first variety, upon being heated in a closed tube, yields a little water and a mere trace of volatile matter. It imparts no color to ether or a solution of caustic potash when boiled therein.

The second variety, when heated in a closed tube, yields a little water and a considerable amount of volatile matter, manifesting itself as a cloud of white and yellow smoke having a strong tarry odor. Like the first variety, it fails to give color when boiled in either ether or solution of caustic potash.

Both varieties, when held in platinum forceps in alcohol flame, give to the flame a slight yellowish tinge and are slowly burnt to a white ash. When ignited in a stream of oxygen gas, both varieties burn with great brilliancy and leave but a very small amount of ash.

The chief interest attached to these fragments of a by-gone vegetation consists in the possibility of identifying the strata in which they occur, by their aid when they have been duly studied, and of fixing by that means, at least approximately, the age of the rhyolites which now rest upon them. These rhyolites have by some been referred to the Tertiary period; but in the almost entire absence of data upon which to base an opinion, it seems premature even to hazard a conjecture upon the subject. Nevertheless it seems to me from such data as we already possess to be a highly probable conclusion, for it seems quite probable that the sedimentary rocks underlying them will upon due investigation be referred to the Upper Cretaceous period.

Hungarian Government Encouragement of Manufactures.—The Hungarian government intends to facilitate the establishment of new industries in the country, partly in order to emancipate itself from its present dependence on the Austrian market. The government encourages foreign enterprise by exempting factories erected under this act from all taxation during fifteen years; by giving right to acquire lots for the buildings; by waving the tariff duty on the machinery, tools and material for the constructions, and by reducing the railroad freight on the same. German capitalists are now on the spot to study the resources of the country, and French papers publish the inducements offered.

The Suez Canal.—Mr. James Laing, of Sunderland, one of the English directors of the Suez Canal Company, has recently given the following account of the improvements now being carried out in this important waterway. He said that the work of enlarging and deepening the canal had been carried on since the decision of the International Commission in 1884. The work of deepening had been done in two sections, and the first half-metre had been finished. The result would be that while the limited draught of water though the canal was 24 feet 7 inches, he thought it was just possible that the increased depth would be something near to, if not quite, 26 feet. With regard to the tonnage which passed through the canal last year, it might be interesting to know that in 1888 it was 9,437,957 gross tons, while in 1889 it was 9,605,745 tons, showing a substantial increase. Before the Suez Canal Convention met in 1883, the average time occupied in passing through was 74 hours. At present, by the introduction of the electric light, the time in which vessels were passing through in the night was only about 22 hours and a few minutes.

THE CRIMORA MANGANESE MINE OF VIRGINIA.

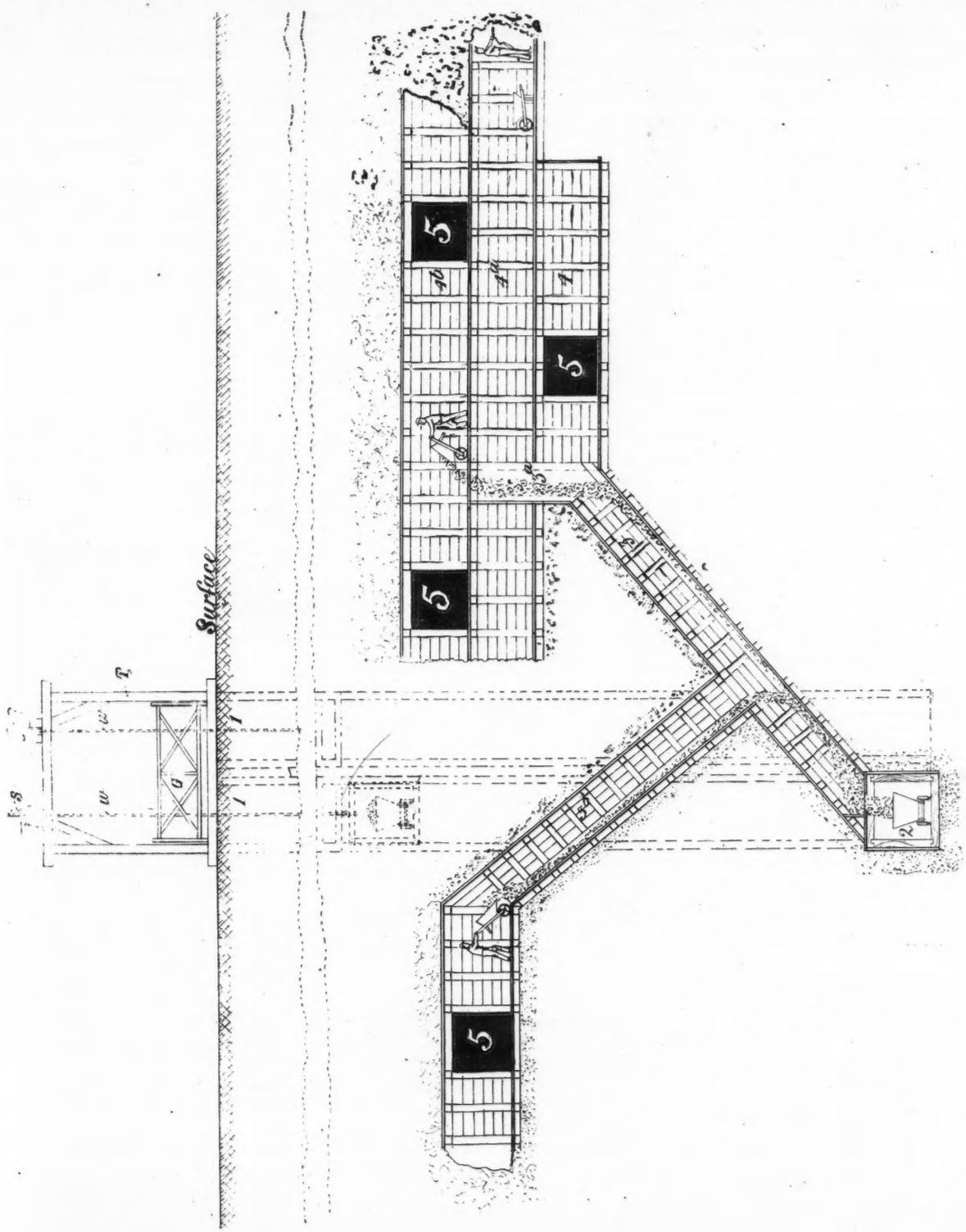
The Crimora mine is situated in Augusta County, two and a half miles from Crimora Station, on the Shenandoah Valley Railroad, with which it is connected by a branch road.

The ore deposit, which is most peculiar in its location and accumulation, occurs in an elliptical basin about 500 feet broad on its transverse axis, and 800 to 900 feet long. This basin is cut out of the Potsdam sandstone, which is at this place hard rock. Opposite to the basin and at a right angle to its longer axis is a deep ravine, Turk's Gap, sharply cut into the flanks of the mountain, through which a stream flows. Nearly opposite to this ravine is a ridge that served as a bulwark to the action of the forces at work in this section. Evidently this basin is the work of old-time eroding agencies acting just as water now acts below a river-dam excavating a deep curved section. The formation and location of this basin, as well as the deposit it contains, is exceedingly interesting and peculiar.

The basin is filled with wash and manganese ore lumps. The general body mixture, the mud, sand, and clay, with the lumps of manganese ore, were carried to place by agencies more recent than those which excavated the basin, just as the iron ore pits in the limestone valleys of Pennsylvania were filled in.

There are two, possibly three, special layers of yellow clay, which are rich in lumps and masses of ore, the lower about 30 feet in thickness, the upper about 25 feet thick. A layer of clay, 20 feet thick, almost barren of manganese ore, separates these two ore-bearing layers. The mining operations are at present confined to these beds.

The ore is found in lumps and masses from the size of a small pebble to lumps weighing a quarter of a ton or more. One mass was found which was 115 feet by 60 feet and 50 feet high. These lumps are found scattered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through the basin as above indicated and covering an area of about six acres. The basin at the shaft is 117 feet deep. Some "sheets" of ore formed by the union of masses that lie in a pretty uniform direction, are also found. The large masses when found are blasted in the mine. The smaller pieces, to which the clay adheres quite tenaciously, are washed outside the mine and selections made for the home and foreign markets. A bore-hole 285 feet has been put down into the sandstone under the mine to secure water for washing.

Fig. 1 is a section illustrating the method of mining. Figs. 2 and 3 are front and side elevations of the plant for crushing, washing and separating the ore.

Previous to sinking the shafts for a manganese mine a number of test holes are usually drilled in.

In the main headings tracks are laid of three feet gauge, and trucks of one cubic yard capacity employed, which are conveyed by mules. In the secondary headings wheelbarrows are used for conveying the material to the chutes.

The water in the workings is conveyed in wooden troughs to the chutes, where it passes down with and partly washes the material. Two pumps are employed in the mine, one of 350 and one of 450 gallons a minute capacity, running alternately and regularly.

The trucks in the main heading run on to a cage in a shaft having cages six feet by seven feet, and are hoisted by a one-inch wire rope and drum driven by a 60 horse-power hoisting engine.

About 300 tons of material are mined in a day of 12 hours, which, after crushing, washing and separating, leaves about 50 or 60 tons of ore.

The material having no regular formation, but being heavy and loose, necessitates heavy timbering of the headings, and so great is the strain upon the timber in some places that it has to be renewed about every 30 days.

The great quantity used may be gathered from the fact that about one million and a half feet of timber is used in the Crimora mine in a year.

The main tunnel, 2, is seven feet square, inside measurements, having timbers 12x12 inches three feet apart, which are mortised and tenoned to fit into each other, as shown, to make a firm framework, and having planking or slabs 12x2 inches to the top and sides to resist the outside pressure.

The chutes, 3, are usually 5x6 feet inside, having 10-inch timbers three feet apart, mortised and tenoned to fit into each other, and 12x2-inch planking to the top, sides and bottom.

The stoping is generally 7x7 feet, having 10-inch timbers 4 feet apart, and 12x2-inch planking to the top, sides and bottom. At the bottom of the chutes a door is provided to retain the material during the absence of cars. After the material is landed on the surface it is taken to the crusher, whence it passes through the washers and screens and is conveyed to the cars.

The washing machinery (see Figs. 2 and 3) is driven by a 40 horse power engine running 130 revolutions per minute, both line shafts being driven directly by it. Shaft *A* is driven by a 12-inch belt, from a 33-inch pulley (No. 1) on the engine shaft to a 96-inch (No. 2) pulley on shaft *A* running 44 revolutions per minute. The log washer is driven by a 14-inch pinion (No. 3) on *A* shaft running into a masterwheel (No. 4) 36 inches in diameter, running 18 revolutions per minute. The Bradford washer is driven by a pinion (No. 5) 27 inches in diameter on *A* shaft running into masterwheel (No. 6) 54 inches diameter, running 22 revolutions per minute. The classifying screen is run by an endless chain from a 10-inch sprocket wheel (No. 7) on *A* shaft to a 36-inch sprocket wheel (No. 8) on screen shaft, running 13 revolutions per minute.

Elevator No. 1 is run by a 5-inch belt from a 24-inch pulley (No. 9) on *A* shaft to a 36-inch pulley (No. 10) on counter shaft, from which the power is transmitted by a pinion (No. 11) 10 inches in diameter, to a masterwheel (No. 12) 38 inches diameter, on elevator shaft, on which there are sprocket wheels carrying elevators running 8 revolutions per minute.

Line shaft *B* is run by a 10-inch belt running from a 27-inch pulley (No. 13) on engine shaft to a 48-inch pulley (No. 14) running 72 revolutions per minute. The jig is run by a 6-inch belt from a 36-inch pulley (No. 15) on *B* shaft to 36-inch pulley (No. 16) on jig shaft, running 72 revolutions per minute.

Elevator No. 2 is run by a 6-inch belt from a 12-inch pulley (No. 17) on shaft *B* to a 36-inch pulley (No. 18) on counter shaft, from which the power is transmitted by a pinion (No. 18) 10 inches diameter, running into a masterwheel (No. 20) 38 inches diameter on elevator shaft, on which are sprocket wheels carrying the elevator, running 6 revolutions per minute.

All the elevator buckets are made of steel, as the wear on them is great.

The conveyor is made of 18-inch 6-ply rubber belting running over pulleys 24 inch diameter, and is run by a 6-inch belt from 12 inches pulley (No. 21) on shaft *B* to 36-inch pulley (No. 22) on counter shaft, from which the power is transmitted by a 10-inch pinion (No. 23) running into a masterwheel (No. 24) 38 inches diameter on conveyor shaft running 6 revolutions per minute. On shaft *B* there is a bevel gear, which transmits the power to run the crusher.

All material as it comes from the mine is dumped into the chute above the crusher and fed through it. It falls directly into the "log" washer, which consists of simply two shafts about 18 inches diameter and 24 feet long, on which are bolted spiral shaped teeth running in a box or frame, 24 feet long, 5½ feet wide and 3 feet deep, filled with water; from this the material in a semi-washed state passes into the Bradford washer, which is a cylinder 13 feet long and 4½ feet diameter, with teeth on the inner periphery, or inside, about 7 inches long. From this it goes into the classifying screen (conical shaped) with a mesh of ⅜-inch; all that passes over the screen runs out on the conveyor, and while it is being conveyed into the cars the flint and other refuse matter is picked out.

What passes through the ⅜-inch mesh in classifying screen, runs by a chute into elevator No. 1, and is elevated and dropped into jig, where all foreign matter is removed, the refuse passing off at the top, and the cleaned ore at the bottom runs into settling tank and is elevated by elevator No. 2 and dropped by chute into cars.

All machinery works automatically, and the material is not handled after it is put into the crusher.

For the foregoing description and illustrations we are indebted to the *American Manufacturer*, of Pittsburg.

THE PROPERTIES OF ALUMINUM, WITH SOME INFORMATION RELATING TO THE METAL.*

By Alfred E. Hunt, Jno. W. Langley and Chas. M. Hall.

(*Concluded from page* 316.)

ACTION OF IMPURITIES.

Both Deville and Fremy say that under ordinary temperatures aluminum and sulphur do not unite or act on each other; indeed, Deville says aluminum may be heated in a glass tube to a red heat, in vapor of sulphur, without altering the metal. However, at very high temperatures aluminum and sulphur do combine to form a sulphide of composition of $Al_2 S_3$. Ordinary aluminum of commerce is entirely free from sulphur.

Lead is found as an accidental impurity of aluminum in proportions up to one-quarter of one per cent. In small proportions, so far as yet determined, it has no appreciable action upon the properties of aluminum. In larger proportions lead does not alloy with aluminum, and no homogeneous alloy, or even mixture of the two metals, can easily be obtained.

Antimony does not unite with aluminum to form any homogeneous alloy.

Chromium unites with aluminum readily, hardening it and adding to its tensile strength. An addition of two or three per cent. of chromium to aluminum improves it for many purposes, although, as in the case of other impurities, it decreases the malleability of the aluminum.

Tungsten unites with aluminum, hardening the metal, but not giving any very useful alloys.

Platinum unites with aluminum readily. It, however, does not seem to give any advantageous alloys. They are brittle and unsound.

Tissier says that silver seems to be the metal most useful to improve aluminum; five per cent. of silver giving to aluminum increased elasticity and hardness without injuring the malleability of the metal. The alloy is susceptible of taking a very fine polish. The silver lowers the melting point of the aluminum considerably. We predict that the alloys of silver and aluminum will have a large use in the arts in the future.

No very valuable alloys of tin and aluminum have been discovered; the tin added to aluminum makes it more brittle and does not seem to give any valuable properties in return. However, small proportions, up to two per cent., of aluminum added to tin, renders the tin harder and more elastic without decreasing materially its malleability.

Cadmium unites readily with aluminum, giving fusible alloys which are quite malleable; however, it does not seem to impart strength but rather weakness to the aluminum.

Bismuth unites with aluminum to form brittle, but very fusible, alloys.

Nickel unites with aluminum to form brittle alloys, in any large proportions; in small percentages, up to three per cent. of nickel, its influence is to harden aluminum without seriously decreasing the malleability or ductility of the metal.

An alloy of 70 per cent. of copper, 23 per cent. nickel, and 7 per cent. aluminum, has a fine yellow color and takes a high polish.

Zinc forms alloys readily with aluminum, which are very brittle and highly crystalline.

The best solder yet obtained for aluminum is this alloy of zinc, with it using venetian turpentine as a flux. Unfortunately, it will not flow well, nor are the soldered surfaces capable of withstanding hard usage.

PRACTICAL HINTS.

Dipping and Pickling.—Remove the dirt and grease from the plates by dipping in benzine. To whiten the metal, leaving on the surface a beautiful white mat, the sheet should be first dipped in a strong solution of caustic potash. This solution should then be dipped in a mixture of concentrated acids, then in a solution of undiluted nitric acid; then in a mixture of vinegar and water, equal parts; then washed thoroughly in water, and dried, as usual, in hot sawdust.

To Polish.—Use a fine polishing composition or rouge, or tripoli, and a skeep skin or chamois skin buff, although it is often polished with an ordinary rag buff.

For fine work, to polish aluminum, use a mixture of equal parts, by weight, of olive oil and rum, made into an emulsion by being well shaken together in a bottle. The polishing stone is dipped in this liquid and the metal is polished, without using, however, too much pressure.

Aluminum may be easily ground by using olive oil and pumice.

The surface of aluminum treated with varnish of four parts oil of turpentine to one of stearic acid, or with a mixture of olive oil and rum, shaken into an emulsion, allows an engraving tool to work on aluminum as on pure cooper.

For Burnishing.—Use a bloodstone or steel burnisher. For hand burnishing, use either kerosene oil, or a solution composed of two tablespoonfuls of ground borax dissolved in about a quart of water, with a few drops of ammonia added.

For Lathe Work.—The burnisher should wear upon the fingers of his left hand a piece of canton flannel, keeping it soaked with kerosene, and bringing it in contact with the metal, supplying a constant lubricant.

Very fine effects can be produced by first burnishing or polishing the metal, and then stamping it in polished dies, showing unpolished figures in relief.

Scratch Brushing.—Polish or burnish the surface, and then use a fine steel scratch brush. A very fine finish is attained by rubbing with ground pumicestone and water.

In spinning aluminum, plenty of oil should be used to prevent the clogging of the tool, to make it cut smooth in the turning, and to assist in the spinning.

To Solder the Metal.—Soldering the metal in large surfaces has not been successfully accomplished up to the present. Small surfaces of the metal can be readily soldered by the use of pure zinc and venetian turpentine. Place the solder upon the metal, with venetian turpentine, and heat gently with a blow-pipe until the solder is melted. It will then be found to have fixed itself firmly to the aluminum. The trouble with this, as with other solders, is that it will not flow on the metal. Therefore, large surfaces are not easily soldered.

In cold-rolling aluminum, upon rolls designed for cold-rolling hard

* Paper read at Washington Meeting of American Institute of Mining Engineers February, 1890.

crucible steel, it has been found possible to reduce aluminum through the same sections as hard steel; the aluminum required, on the average, five annealings, where the steel required three to satisfactorily withstand the same work.

ALLOYS OF ALUMINUM AND COPPER.

Ten per cent. aluminum, with 90 per cent. copper (called 10 per cent. aluminum bronze), rolled into plates, has an elastic limit of 70,000 to 80,000 pounds per square inch, a tensile strength of from 100,000 to 120,000 pounds per square inch, a reduction of area of from 20 to 40 per cent., with an elongation of from five to 10 per cent. in eight inches. The metal has a beautiful yellow color, and is susceptible of taking a fine polish. One

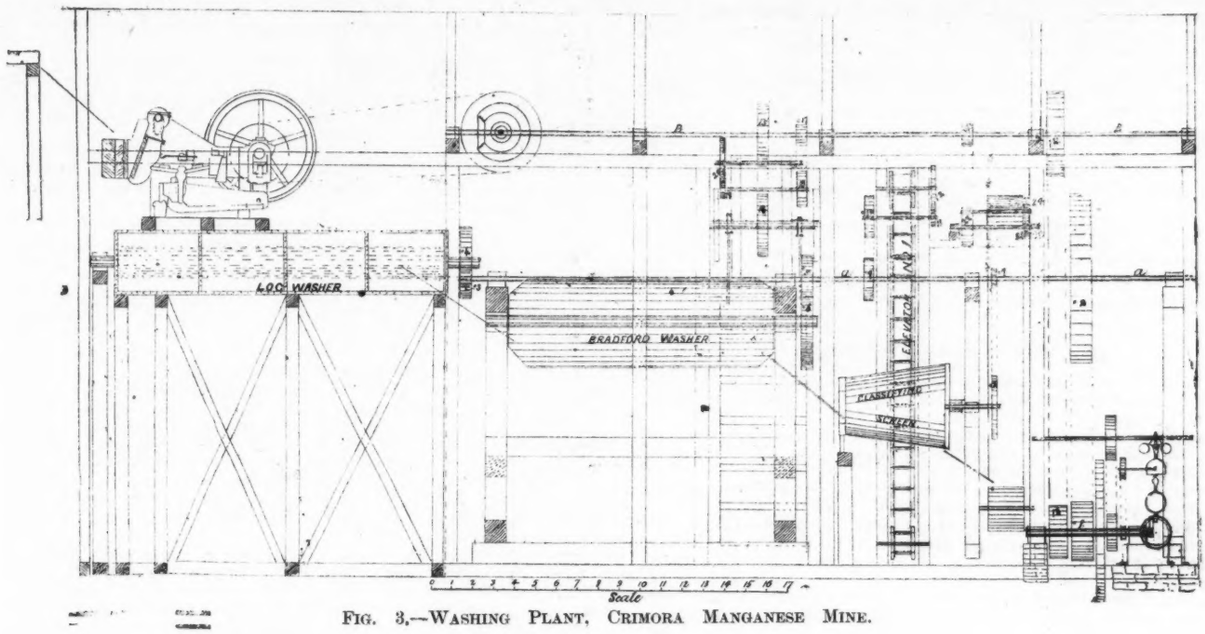


FIG. 3.—WASHING PLANT, CRIMORA MANGANESE MINE.

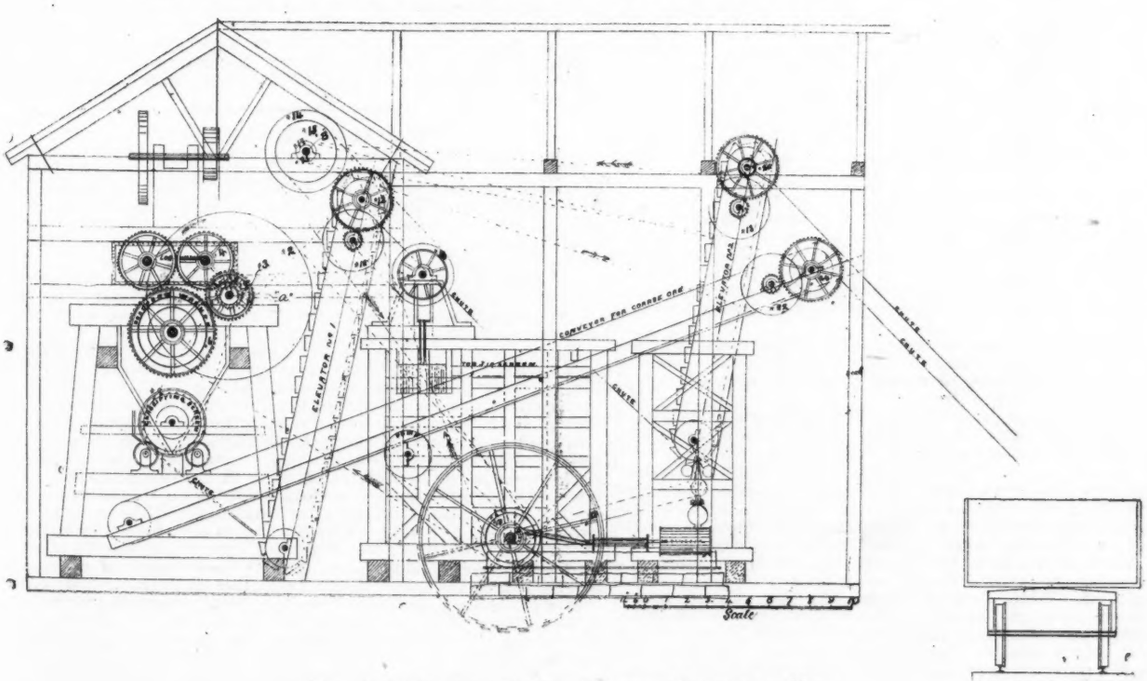


FIG. 2.—WASHING PLANT, CRIMORA MANGANESE MINE.

great advantage of the metal is its freedom from corrosion from the action of the air, either moist or dry, or water, upon it. Its specific gravity, in castings, is about 7·84, and in rolled sheets about 7·89. Its modulus of elasticity is about 18,000,000 pounds. In castings, it has a tensile strength of between 70,000 and 80,000 pounds per square inch, with a reduction of area of about 20 per cent.

Compression tests upon 10 per cent. aluminum bronze, ⅞ inch diameter and 2 inches long, gave an ultimate compressive strength of 160,000 pounds per square inch, the specimens being shortened by ¼ inch. A similar piece of 5 per cent. bronze was shortened to 1¼ inches, and gave an ultimate compressive strength of 153,000 pounds per square inch.

Five per cent. aluminum bronze in tension has an elastic limit of about 50,000 pounds per square inch; a tensile strength of about 70,000 pounds per square inch; a reduction of area of from 30 to 50 per cent. Its specific gravity is from 8·20 to 8·30. Two and one-half per cent. aluminum bronze has a specific gravity of 8·6.

The melting point of 10 per cent. aluminum bronze is about 1,700 degrees Fahrenheit—a little higher than that of ordinary brass. The metal shrinks a little less than one-eighth inch to the foot, or a little less than ordinary brass. It solidifies very rapidly from the molten condition, and it is necessary to pour it very quickly. The feed gates should be made large enough to prevent the metal from freezing. Hot baked sand molds should be used for casting. Precautions should also be taken to prevent oxidation of the metal, for otherwise the oxide is carried into the meta', which prevents its rolling into sheets. It is well also to bottom pour the metal into the mold, that is, to cast the metal into a hot ladle, having a nozzle in the bottom in direct connection with the gate of the casting, allowing the metal to settle, so that the oxide and dross shall come to the surface, in this way preventing their entering into the castings below. The surface of the molten bath should be kept covered with powdered charcoal. It is also advantageous, in some cases, to keep the bath covered with a flux, although the disadvantage of this is that the flux is apt to cut the sides of the pot and add silicon to the metal. It is well to tap the metal in an inert atmosphere (casting in a cloud of smoke or the like), to prevent the oxidation from the air in the mold attacking the metal.

Aluminum bronze is an extremely dense, close-grained metal. It can be worked at a bright red heat as easily as wrought iron. In this respect it differs from all other forms of bronze, which are red-short.

The fact that aluminum bronze is malleable at a red heat, and stands this temperature without change, makes it especially adaptable for blast furnace tuyeres. The metal can be hardened to a considerable extent by working without annealing.

To anneal aluminum bronze, heat to a dull red heat and permit it to cool gradually.

The alloy of aluminum and copper does not volatilize at any ordinary temperatures used in fusing it, and consequently it can frequently be remelted without any appreciable change in the chemical constituents of the metal. This has great advantages in the economic use of the metal, as the scrap in castings or rolling can be readily remelted into ingots of the same quality of metal.

Aluminum bronze can be brazed as well as any other metal, using as a solder: zinc, 50 per cent.; copper, 50 per cent.; using one-quarter of the solder and three-quarters borax and cryolite in equal parts.

The following are some of the analyses of aluminum bronzes lately made by the Pittsburg Reduction Company and by the Scovill Manufacturing Company:

KIND OF ALLOY.	% Aluminum.	% Copper	% Graphitoidal silicon.	% Non-Graphitodial silicon.	% Iron.	Spec. Gravity.
10% bronze casting made Dec. 5th, 1889..	9·20	90·00	0·117	0·370	0·077	7·69
5% " " " " " ..	4·70	94·84	0·080	0·320	0·060	8·25
2½% " " " " " ..	2·35	97·29	0·05	0·26	0·050	8·61
10% bronze casting made at Neuhausen.	6·32	91·98	0·09	1·09	0·48	8·01

ALLOYS OF ALUMINUM AND IRON.

Aluminum in Wrought Iron.—The influence of aluminum in making wrought iron has been taken advantage of in the well-known Mitis process of making castings of wrought iron.

Aluminum in Cast Iron.—The influence of aluminum in cast iron is to turn the combined carbon to graphite; that is, to make the white iron gray, and also to close the texture of the metal. (W. J. Keep.)

It has been used in preparations from one-tenth of one per cent. to two per cent., with good results, with various grades of iron.

Aluminum in Steel.—The influence of aluminum in steel of high carbon is to turn the carbon combined into graphite, and to destroy the hardening action of the carbon in tool steel. Aluminum in this sense softens steel. In structural steel of ·20 per cent. carbon a small amount of aluminum, up to one per cent., increases the tensile strength without decreasing the ductility to any great degree. By its aid a higher tensile strength can be obained in thick sections of steel which have been subjected to but little work than can otherwise be obtained; although aluminum with considerable quantities of graphitoidal silicon has been added to steel, no graphitoidal silicon has been found in the steel afterward, it being all found in the amorphous or combined state in the resulting steel. It is frequently stated that the influence of aluminum is to lower the melting point of the steel, and in this way make it more fluid, also to make the ingots of steel more solid and free from blowholes. It can be most advantageously used in proportions of from one-tenth of one per cent. up to three per cent. of aluminum.

METHODS OF ANALYSIS OF ALUMINUM AND ITS ALLOYS.

As most of the properties of aluminum are very materially affected by the purity of the metal, and as the literature of methods of analyses of aluminum metal and its alloys is very scant, we have considered it appropriate to append to this paper the methods used by the Pittsburg Testing Laboratory in the various analyses referred to, and which have been largely used as a basis of information in the conclusions drawn in this paper.

For Iron.—Dissolve from one to five grammes of the metal in hydrochloric acid and reduce with stannic chloride, taking up the excess of stannic chloride with bi-chloride of mercury. Titrate with a standard solution of bi-chromate of potash.

For Silicon.—Dissolve one gramme of metal in aqua regia, composed of equal parts of nitric and hydrochloric acids; evaporate to dryness; take into solution with five c. c. of strong hydrochloric acid; add water, boil and filter off the gray residue; wash with dilute hydrochloric acid; ignite and weigh as silicon, plus silica; fuse with carbonate of soda; dissolve in dilute muriatic acid; evaporate to dryness; re-dissolve in dilute hydrochloric acid, and filter off total silica. The difference between the weight of the silicon and the silica is the oxygen, which is united with the graphitoidal silicon, from which the amount of graphitoidal silicon can be calculated.

Copper and Lead.—Dilute the filtrate from the silica till free hydrochloric acid is only about one per cent. of the solution. Pass sulphuretted hydrogen through the hot solution and filter off sulphate of copper and lead. Dissolve in 1·2 nitric acid and filter off sulphur. Add 5 c. c. sulphuric acid and evaporate to sulphur fumes. Dilute, and in a short time filter it from sulphate of lead into a platinum dish. The lead sulphate should be weighed and lead calculated from it. Nearly neutralize with ammonia, leaving about two drops of sulphuric acid (dilute), and precipitate copper by battery.

Aluminum.—Receive filtrate from sulphate of copper and lead in 500 c. c. flask and make up to the 500 c. c. mark with water. Take 50 c. c. of thesolution (equal to $\frac{1}{10}$ gramme of the metal); boil off the free sulphuretted hydrogen; oxidize the iron in the solution with a little bromine water, and add sufficient ammonia to precipitate the sesqui-oxide of iron and alumina, which, after careful washing, ignite and weigh. Subtract the sesqui-oxide of iron calculated from the iron found by titration and the weight of any phosphoric acid which may be present, and calculate the remainder as Al_2O_3, from which the percentage of aluminum can readily be reckoned. (We have not found more than a trace of phosphorus in any of the samples of aluminum manufactured by the Pittsburg Reduction Company.)

Calcium.—A trace may be found in the filtrates from iron and alumina, and is separated in the usual way. The filtrate from the calcium can be readily examined for magnesium. (We do not find any magnesium present in the metal manufactured by the Pittsburg Reduction Company.)

Alkalies.—Dissolve one gramme in hydrochloric acid and evaporate in a platinum dish to separate the silica, and proceed as usual until the sesqui-oxides of alumina and iron are precipitated with ammonia. Dissolve this, after washing, in nitric acid, in platinum, and evaporate to dryness on the water-bath. Finally, heat over a small flame until the nitrate of alumina is all decomposed. This condition is indicated when the residue is white and friable and no acid fumes can be detected by ammonia. Treat residue with hot water and get alkali nitrates in solution. This, together with the filtrate from alumina, contains all the alkali present, which should be evaporated, and after separating contained portions of lime and magnesia, weighed as chlorides. (No sodium or potassium is found in the metal manufactured by the Pittsburg Reduction Company.)

METHODS OF PREPARATION OF ALUMINA.

As considerable inquiry has been made as to the ore from which aluminum is made, it may be well to state here that aluminum is now being manufactured from the oxide, alumina, which is purified chemically from silica and iron, from the native bauxite mineral. Bauxite is found in considerable quantities, and fully as pure in quality as the best foreign mineral, in the States of North Carolina and Georgia, and there are vast deposits of it in Ireland and Northern France. The average composition of bauxite is about as follows:

	Al_2O_3	SiO_2	Fe_2O_3	H_2O	FlO_2	$CaCo_3$	Authority.
White from Beaux, France	58·10	21·70	3·00	14·00	3·20	trace	Dana.
Brownish red from Revest, France.....	57·60	28·0	25·30	10·80	3·10	0·40	Dana.
Oolite from Allauch, France	55·40	48 0	24·80	11·60	3·20	0·20	Pittsburg Testing Labor't'y.

The two methods of purification of bauxite are as follows:

Bauxite, or a rich clay, chosen as free from iron as possible, is roasted at a low red heat, and afterward is treated with sulphuric acid, which combines with the alumina present, forming sulphate of alumina. This is readily dissolved by water, leaving the great bulk of silica and iron behind. The solution of sulphate of alumina is allowed to settle, the supernatant liquid siphoned off into an evaporating tank and evaporated to dryness. The dry sulphate of alumina is calcined at a red heat, driving off the sulphuric acid, leaving as a residue anhydrous alumina. This calcination seems to be as easy as the calcination of alumina hydrate, and there appears to be no difficulty in condensing the volatilized sulphuric acid, which can be used over again. This process is easier, on a laboratory scale, than the soda carbonate method, which is about as follows:

Bauxite is fused with carbonate of soda in a reverberatory furnace. The fused mass is lixiviated with water, which dissolves aluminate of soda, which is decanted off. The solution of aluminate of soda is decomposed by carbonic acid gas, which forms carbonate of soda, which remains in solution, and the alumina hydrate is precipitated. This alumina hydrate is afterward washed repeatedly with water, dried, and calcined at a red heat for a considerable time, which forms anhydrous alumina.

PROCESS OF MAKING CHLORINE.*

An improvement in the process of evolving chlorine consists in first calcining in a suitable furnace the clay to be mixed with the chlorine, then placing the calcined clay mixed with calcium chloride or other chloride in a high tower, having tuyeres leading thereinto about midway the height thereof, and forcing a blast of air upward from the bottom of the furnace or tower.

The apparatus for conducting this process is herewith illustrated, Fig. 1 being a vertical section of the tower used for decomposing the calcium chloride mixed with the calcined clay, and Fig. 2 a horizontal section of the furnace, taken on line x x, Fig. 1.

The silicious clay is first calcined separately, so as to drive off the water which it contains and to obtain a decomposing material, which has at the same time the advantages of silicious and clay-like materials. This calcination can be accomplished by putting the clay, in the form of small bricks, into an appropriate furnace, and afterward reducing it to powder.

It has been customary to form the furnaces for decomposing the material containing chlorine and evolving the same therefrom so as to exclude from the field of reaction the combustible or carbonated gases. Chlorine has a strong affinity for carbonic oxide, forming therewith oxychloride of carbon, or carbonyl chloride, from which the chlorine cannot be recovered in its active state. With this fact in view it has been customary to decompose the chlorine containing material by means of furnaces heated from the outside, thus preventing the entrance of carbonic oxide and the consequent forming of oxychloride of carbon. This process of evolving chlorine by heating from the outside necessitates the use of a great amount of fuel, and greatly adds to the cost of production.

By means of the furnace illustrated, the carbonic oxide is introduced directly into the decomposing chamber, but, by the peculiar arrangement of the parts, the formation of oxychloride of carbon gas is prevented.

A represents the decomposing furnace, consisting of a high tower having a thick envelope of non-conducting material, B, to prevent radiation.

In the upper part of the furnace A is an opening, A', having a removable cover or cap, and into this opening a mixture of calcium chloride and calcined silicious clay is inserted until the tower is filled.

In the lower part of the furnace is an opening, A^2, into which the pipe C discharges and forces a current of air into the lower part of the furnace, whence it constantly ascends.

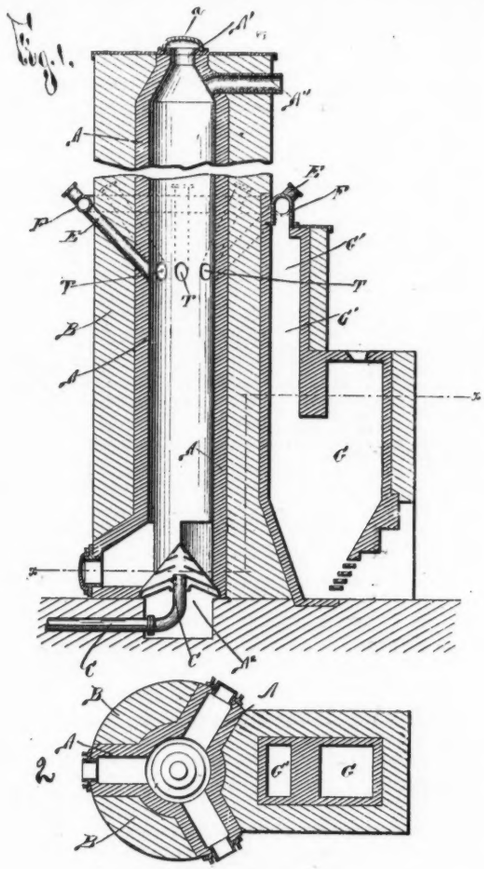
Interposed between the openings A' and A, about midway the height of the furnace, are apertures or tuyeres, T, through which a crown of pipes, E, discharge the fuel, preferably carbonic oxide. The pipes E are connected by a suitable main or connecting pipe, D, to discharge G' of the furnace G.

Coal or other fuel is placed in the furnace G, and the fire is so regulated that an abundance of carbonic oxide is produced and conducted

* From the *Paper Trade Journal*.

from the flue or discharge G' of the furnace G to the main D, whence it is inserted into the midst of the material in the furnace A by means of the pipes E, discharging through the tuyeres T. The air inserted from the bottom of the furnace A brings about the combustion of the carbonic oxide, and is supplied in sufficient quantities to combine with the calcium chloride mixed with the silicious clay-like substance, and to produce the reaction $3CaCl_2 + Al_2\ 3SiO_3 + 3CO = Al_2O_3 + 3CaSiO_3 + 3Cl_2$. The combustion of the carbonic oxide soon heats to a white heat the material on a level with the tuyeres forming the combustion zone of the furnace. This zone extends only a short distance, and immediately above the same is the decomposing zone, in which the material is heated to a red heat, and is thoroughly decomposed before its contact with the carbonic oxide in the combustion zone, thus preventing the formation of oxychloride of carbon.

The peculiar arrangement of the tuyeres and the manner of recovering the heat bring about a perfect combustion of the carbonic oxide gas, and the heat is sufficiently intense to thoroughly decompose the material before its entrance into the cumbustion zone, and its consequent meeting with the fresh carbonic oxide gas discharged through the tuyeres. The carbonic oxide uniting with an atom of oxygen of the introduced air forms carbonic anhydride, which is discharged through the discharge opening A' at the same time with the chloride gas; but as there is no affinity between the two gases, they do not unite with each other and may readily be separated. The gases which are produced in this process would carry off a great share of heat were it not for the fact that the combustion zone is about midway the height of the furnace A, and the weight of material presses down upon the gases and causes them to pass slowly therethrough and to impart their heat to the material, which is substantially cold, thus preventing loss of heat. The material having been acted upon sinks gradually to the bottom of the furnace, whence it is readily removed through suitable openings, A^3, provided therein. Considerable loss of heat would accrue from the constant feeding downward of the decomposed material were it not that the current of cold air rising upward through the lower part of the furnace meets the descending decomposed material and causes the latter to lose its heat, carrying backward to the decomposing zone and heating the air before its contact with the carbonic oxide and the chloride mixture in the combustion zone, thus greatly facilitating the combustion. This process is exceedingly simple, and is said to be very effective in the production of chlorine gas, and it will be understood that in place of the calcium chloride other chlorides which would combine with the silicon of the clay might be used, that the clay might be used without being first calcined, and that the order of the steps of the process might be somewhat varied from that described.

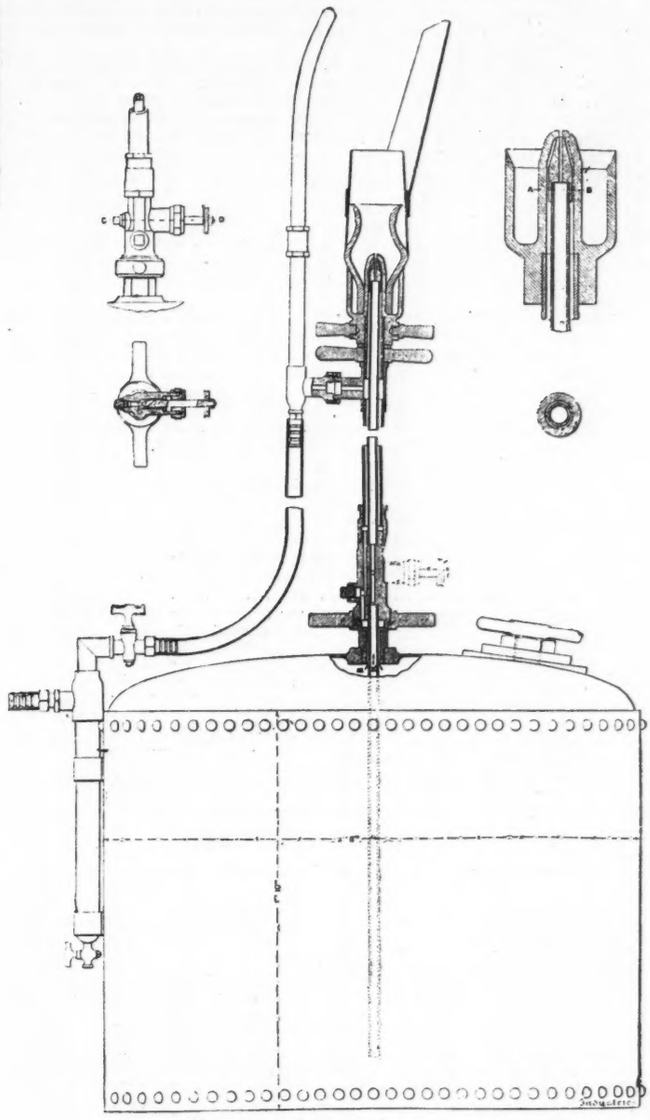


CHLORINE GENERATOR.

Rope Transmission of Power.—At Newark-on-Trent, England, a steel cable of less than one-half inch diameter transmits 30 to 35 horse power, without slip, at a speed of 2,592 feet per minute, or 29·45 miles per hour. It is driven by 8-foot pulleys.

THE LUCIGEN LIGHT.

The good work done by this light during the construction of the Forth Bridge makes it, according to our contemporary, *Industries*, a formidable opponent of the electric arc for such work. The light is obtained by forcing a heavy hydro-carbon oil in the form of a spray through a small nozzle by means of air pressure. The flame is about three feet six inches long and emits a light of great intensity and diffusive power. To maintain the air pressure for each light of 2,500 candle power only 25 horse power is required. We illustrate the form of the Lucigen light, with details of the construction of the apparatus as used at the Forth Bridge, and we speak from personal experience when we say that such a light should be kept at every mine for emergency work at night. The apparatus is manufactured of capacities varying from 250 to 10,000 candle power, and is apparently all that it is claimed to be, economical both in cost of plant and in maintenance with efficiency.



DETAILS OF LUCIGEN LIGHT.

Power of the Sun.—Mr. R. Savelief, Kiev, Russia, has made a series of observations in 1888-89, with the object of ascertaining the number of calories which the sun puts at our disposal. The apparatus used was the actinometer with Mr. Crova's gramme-degree or calorie-scale. The heat imparted to a square centimeter of the evenly leveled soil was recorded in diagrams and finally expressed in a formula, by means of which the total quantity of calories on one square centimeter during the day can be deduced from the calorific intensity at noon. The following conclusions are arrived at:

At the outside of the atmosphere the annual heat received by one centimeter of horizontal surface is 337,900 calories, of which only 123,500 calories reach the solid globe, and the sky is, at that, supposed to be constantly clear and unclouded; in other words, 63½ per cent. is absorbed by the atmosphere, and only 36½ per cent. reaches the soil. This figure rises in October to 41 per cent. and sinks to 28 per cent. in January and February, the maximum, in July, being 610 calories, and the minimum, in December, 87.

These results seem to shake seriously the belief in the industrial utilization of the solar heat in our climes.—*Revue Industrielle.*

OFFICIAL REPORTS.

THE ATLANTIC MINING COMPANY.

The directors present the following report of operations during the year 1889:

The production of mineral was 5,099,504 pounds, which yielded $73\frac{83}{100}$ per cent., or 3,698,837 pounds of refined copper, which realized an average price of about $12\frac{0}{100}$ cents per pound.

The following is a summary of the year's business: Production—3,698,837 pounds copper at $12\frac{03}{100}$ cents, $447,291.25: add balance of interest account, $6,022.42; add dividend received on estate of Thos. J. Pope & Bro., $502.40; total, $453.816.07.

Costs—Working expenses at mine, as per clerk's tables, $333,120.17; freight, $9,364.97; smelting, $36,510.55; expenses, $7,203.78; brokerage, $2,047.36; insurance, storage, taxes (city and State of New York), $1,-220.07; total, $389,466.90. Showing a mining profit in 1889 of $64,349.17.

There has been expended for additions to plant, $37,669.56, leaving a net gain for the year of $26,679.61; the surplus from 1888, after payment of dividend, was $302,564.80, less allowances on inventories of supplies at mine, $6,223.48, leaving $296,341.32; making the net surplus, Dec. 31, 1889, $323,020.93, out of which a dividend of one dollar and fifty cents per share ($60,000) was paid Feb. 1st, 1890.

The decline of nearly $2\frac{3}{4}$ cents per pound in the price of copper from the average price obtained in 1888 has largely diminished profits, while the product has slightly decreased from causes which appear in our agent's report.

The average yield of the rock stamped was about the same as that of the previous year, and lower than the average of former years by about one pound of copper to the ton of rock. The results obtained in the mill this year by stamping a smaller quantity, while indicating that the mill was crowded to some extent in 1888, do not account for this reduction in yield, which must be attributed to a leaner run of ground than usual. The difference of one pound of copper to the ton, while not perceptible to the eye, lessens materially the product of an entire year.

The necessity for more powerful and rapid hoisting arrangements to command the deeper portions of the mine has been recognized for some time past, and their construction could no longer be delayed without interfering with regular production.

An unusual quantity of repairs to machinery, buildings, etc., has been required, and the cost thereof included in the running expenses.

The following is a summary of results for the year 1889:

Rock stamped	278,680 tons
Product of mineral	5,099,504 lbs.
Product of refined copper	3,698,837 "
Yield of rock treated 13·272 lbs. copper per ton, or	0·663 per cent.
Gross value of product, per ton of rock treated	$1.6050
Cost per ton of mining, selecting and breaking, and all surface expenses, including taxes	.8787
Cost per ton of transportation to mill	.0388
Cost of ton of stamping and separating	.2778
Cost per ton of working expenses at mine	1.1953
Cost per ton of freight, smelting and marketing product including New York office expenses	.2022
Cost per ton of running expenses	1.3975
Total expenditure per ton of rock treated	1.5327
Cost of copper laid down and marketed in New York per pound	.1052

METRIC CONVERSION TABLES.

TABLES FOR CONVERTING U. S. WEIGHTS AND MEASURES—CUSTOMARY TO METRIC.

LINEAR.

Inches to millimeters.	Feet to meters.	Yards to meters.	Miles to kilometers.
25·4000	0·304801	0·914402	1·60935
50·8001	0·609601	1·828804	3·21869
76·2001	0·914402	2·743205	4·82804
101·6002	1·219202	3·657607	6·43739
127·0002	1·524003	4·572009	8·04674
152·4003	1·828804	5·486411	9·65608
177·8003	2·133604	6·400813	11·26543
203·2004	2·438405	7·315215	12·87478
228·6004	2·743205	8·229616	14·48412

CAPACITY.

Fluid drams to milliliters or cubic centimeters.	Fluid ounces to liters.	Quarts to liters.	Gallons to liters.
3·70	29·57	0·94636	3·78544
7·39	59·15	1·89272	7·57088
11·09	88·72	2·83908	11·35632
14·79	118·30	3·78544	15·14176
18·48	147·87	4·73180	18·92720
22·18	177·44	5·67816	22·71264
25·88	207·02	6·62452	26·49808
29·57	236·59	7·57088	30·28352
33·28	266·16	8·51724	34·06896

SQUARE.

Square inches to square centimeters.	Square feet to square decimeters.	Square yards to square meters.	Acres to hectares.
6·452	9·290	0·836	0·4047
12·903	18·581	1·672	0·8094
19·355	27·871	2·508	1·2141
25·807	37·161	3·344	1·6187
32·258	46·452	4·181	2·0234
38·710	55·742	5·017	2·4281
45·161	65·032	5·853	2·8328
51·613	74·323	6·689	3·2375
58·065	83·613	7·525	3·6422

WEIGHT.

Grains to milligrammes.	Avoirdupois ounces to grammes.	Avoirdupois pounds to kilogrammes.	Troy ounces to grammes.
64·7989	28·3495	0·45359	31·10348
129·5978	56·6991	0·90719	62·20696
194·3968	85·0486	1·36078	93·31044
259·1957	113·3981	1·81437	124·41392
323·9946	141·7476	2·26796	155·51740
388·7935	170·0972	2·72156	186.62089
453·5924	198·4467	3·17515	217·72437
518·3914	226·7962	3·62874	248·82785
583·1903	255·1457	4·08233	279·93133

CUBIC.

Cubic inches to cubic centimeters.	Cubic feet to cubic meters.	Cubic yards to cubic meters.
16·387	0·02832	0·765
32·774	0·05663	1·529
49·161	0·08495	2·294
65·549	0·11327	3·058
81·936	0·14158	3·823
98·323	0·16990	4·587
114·710	0·19822	5·352
131·097	0·22654	6·116
147·484	0·25485	6·881

Bushels to hectoliters.

0·35242	1 chain	= 20·1169 meters.
0·70485	1 square mile	= 259· hectares.
1·05727	1 fathom	= 1·829 meters.
1·40969	1 nautical mile = 1853·27 meters	
1·76211	1 foot = 0·304801 meter.	
		9·4840158 log.
2·11454	1 avoir. pound = 453·5924277 gram	
2·46696	15432.35639 grains = 1 kilogramme.	
2·81938		
3·17181		

The only authorized material standard of customary length is the Trough ton scale belonging to this office, whose length at 59.62 degrees Fahr. conforms to the British standard. The yard in use in the United States is therefore equal to the British yard.

The only authorized material standard of customary weight is the Troy pound of the Mint. It is of brass of unknown density, and therefore not suitable for a standard of mass. It was derived from the British standard Troy pound of 1758 by direct comparison. The British avoirdupois pound was also derived from the latter and contains 7,000 grains Troy.

The grain Troy is therefore the same as the grain Avoirdupois, and the pound Avoirdupois in use in the United States is equal to the British pound Avoirdupois.

The British gallon = 4·54346 liters.

The British bushel = 36.3477 liters.

TABLES FOR CONVERTING U. S. WEIGHTS AND MEASURES—METRIC TO CUSTOMARY.

LINEAR.

Meters to inches.	Meters to feet.	Meters to yards.	Kilometers to miles.
39·3700	3·28083	1·093611	0·62137
78·7400	6·56167	2·187222	1·24274
118·1100	9·84250	3·280833	1·86411
157·4800	13·12333	4·374444	2·48548
196·8500	16·40417	5·468056	3·10685
236·2200	19·68500	6·561667	3·72822
275·5900	22·96583	7·655278	4·34959
314·9600	26·24667	8·748889	4·97096
354·3300	29·52750	9·842500	5·59233

CAPACITY.

Milliliters or cubic centiliters to fluid drams.	Centiliters to fluid ounces.	Liters to quarts.	Dekaliters to gallons.	Hektoliters to bushels
0·27	0·338	1·0567	2·6417	2·8375
0·54	0·676	2·1134	5·2834	5·6750
0·81	1·014	3·1700	7 9251	8·5125
1·08	1·352	4·2267	10·5668	11·3500
1·35	1·691	5·2834	13·2085	14·1875
1·62	2·029	6·3401	15·8502	17·0250
1·89	2·368	7·3968	18·4919	19·8625
2·16	2·706	8·4534	21·1336	22 7000
2·43	3·043	9·5101	23·7753	25·5375

SQUARE.

Square centimeters to square inches.	Square meters to square feet.	Square meters to square yards.	Hectares to acres.
0 1550	10·764	1·196	2·471
0·3100	21·528	2 392	4·942
0·4650	32·292	3·588	7·413
0·6200	43·055	4·784	9·884
0·7750	53·819	5·980	12·355
0·9300	64·583	7·176	14·826
1·0850	75 347	8·372	17·297
1·2400	86·111	9·568	19·768
1·3950	96·874	10·764	22·239

WEIGHT.

Milligrammes to grains.	Kilogrammes to grains.	Hectogrammes (100 grammes) to ounces av.	Kilogrammes to pounds avoirdupois.
0·01543	15432·36	3·5274	2·20462
0·03086	30864·71	7·0548	4·40924
0·04630	46297·07	10 5822	6·61386
0·06173	61729·43	14·1096	8·81849
0·07716	77161·78	17·6370	11·02311
0·09259	92594·14	21·1644	13·22773
0·10803	108026·49	24·6918	15 43235
0·12346	123458·85	28·2192	17·63697
0·13889	138891·21	31·7466	19·84159

CUBIC.

Cubic centimeters to cubic inches.	Cubic decimeters to cubic inches.	Cubic meters to cubic feet.	Cubic meters to cubic yards.
0 0610	61·023	35·314	1·308
0·1220	122·047	70·629	2·616
0·1831	183·070	105·943	3·924
0·2441	244·093	141·258	5·232
0·3051	305 117	176·572	6·540
0 3661	366·140	211·887	7·848
0·4272	427·163	247·201	9·156
0·4882	488·187	282·516	10·464
0·5492	549·210	317·830	11·771

WEIGHT—(continued).

Quintals to pounds av.	Milliers or tonnes to pounds av.	Grammes to ounces, Troy.
220·46	2204·6	0·03215
440·92	4409·2	0·06430
661·38	6613·8	0·09645
881 84	8818 4	0·12860
1102·30	11023·0	0·16075
1322·76	13227·6	0·19290
1543·22	15432·2	0·22505
1763·68	17636·8	0·25721
1984·14	19841·4	0·28936

By the concurrent action of the principal governments of the world an International Bureau of Weights and Measures has been established near Paris. Under the direction of the International Committee, two ingots were cast of pure platinum-iridium in the proportion of nine parts of the former to one of the latter metal. From one of these a certain number of kilogrammes were prepared, from the other a definite number of meter bars. These standards of weight and length were intercompared, without preference, and certain ones were selected as international prototype standards. The others were distributed by lot to the different governments and are called national prototype standards. Those apportioned to the United States are in the keeping of this office.

The metric system was legalized in the United States in 1866.

The international standard meter is derived from the Metre des Archives, and its length is defined by the distance between two lines at 0 degrees centrigrade, on a platinum-iridium bar deposited at the International Bureau of Weights and Measures.

The international standard kilogramme is a mass of platinum-iridium deposited at the same piace, and its weight in vacuo is the same as that of the Kilogramme des Archives.

The liter is equal to a cubic decimeter of water, and it is measured by the quantity of distilled water which, at its maximum density, will counterpoise the standard kilogramme in a vacuum, the volume of such a quantity of water being, as nearly as has been ascertained, equal to a cubic decimeter.

New Yttria and Thoria Minerals.—W. E. Hidden and J. B. Mackintosh have found three new minerals in the locality near Bluffton, Llano County, Texas, which has lately yielded unusual quantities of minerals of the rarer earths—yttrialite, a thorium-yttrium silicate; thoro-gummite, a hydrated uranium thoro-silicate; and nivenite, a hydrated thorium-yttrium-lead-silica. Besides these new species, the locality has produced considerable quantities of gadolinite, fergusonite and other heretofore rare minerals. A full account is given in the *American Journal of Science*, to which periodical Dr. Genth had contributed a paper on the Texas gadolinite in September, 1889. The locality is mineralogically remarkable, and furnishes a great variety of specimens. The country rock is a red granite traversed by numerous quartz veins, in the pockets of which the yttria and thoria minerals occur.

Sulphuretted Hydrogen Generator.—The following is a description from the *Chemical News* of an improved H_2S generator, invented by W. Oakes Kibble, of the Finsbury Technical College, London The advantages claimed are as follows: 1. Simplicity—hence small cost. 2. Sulphide is effectively prevented from entering main body of acid, thus saving waste and smell. 3. Very easily re-charged and cleaned. 4. Store of gas is always ready. 5. When not in use the action ceases automatically. 6. A continuous supply at a moderate pressure —4 inches in water in smallest to 8 or 12 inches in larger. 7. Any part, if broken, can be renewed at a proportional cost. 8. The acid being used from the top, the specifically heavier spent acid does not interfere with working of apparatus even after standing for days. 9. No direct escape of gas. 10. Compactness.

Parts and Functions of Apparatus.—Inner tube with studs holding glass ball (loosely fitting); this supports sulphide of iron. The bottom is closed and a tube sealed in, thus forming an effectual trap for the small particles of sulphide. An outer tube drawn out for attachment of rubber tube and tap or pinch-cock. A glass tube (thin) from the trap into which it fits, reaching three-fourths of the way upon the outside. A rubber collar at the bottom and band at the top of inner tube to prevent jarring. An ordinary broad-necked reagent bottle to hold acid. A rubber ring is fitted three-fourths of the way round in the neck to prevent outer cylinder from rising.

To use, fill jar three-fourths full of acid (dilute), then put in inner tube filled with sulphide, and slip outer tube over it; shut tap or close pinch-cock. The acid which has entered acts immediately on the sulphide, generating H_2S, which fills the tubes, leaving the sulphide practically dry, any pieces of sulphide falling being dissolved. As the gas is used, acid re-enters and generates fresh supply.

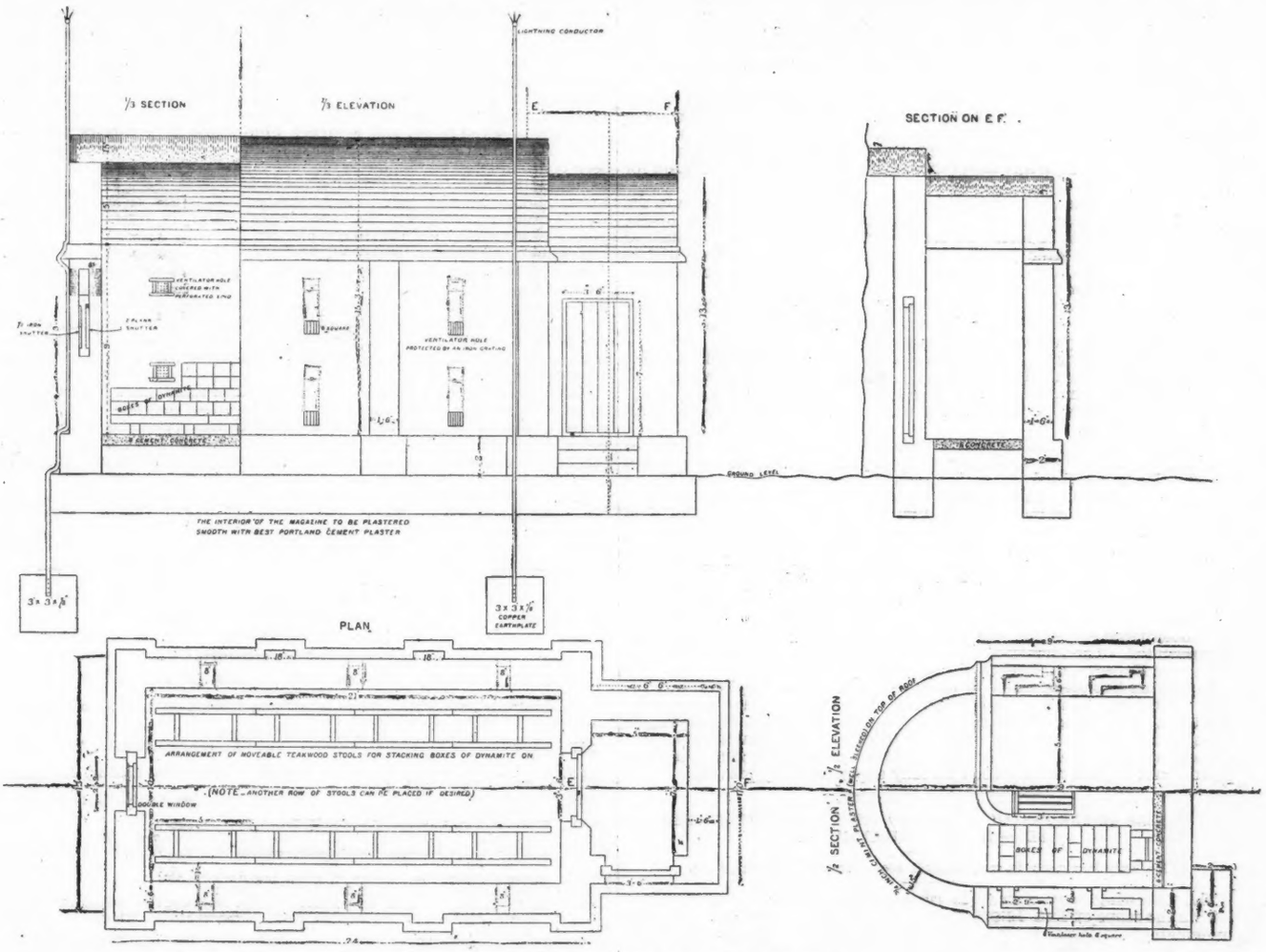
It will shortly be obtainable in sizes from 10 inches high, 3 inches in diameter to 20 inches high and 7—8 inches in diameter, the capacity of the smallest being about one liter and the largest about 10 liters.

DYNAMITE MAGAZINE FOR A TROPICAL CLIMATE.

In view of the large amount of work requiring the use of explosives about to be undertaken in the construction of the Nicaragua Canal, and the constant development of the mineral resources of Central America, we think it opportune to reproduce from *Indian Engineering* a design for a dynamite magazine in a tropical country. Every engineer who has had experience in the use of dynamite or similar explosives in hot and damp climates has suffered from their deterioration, and this becomes aggravated when the necessity arises, in consequence of being distant from base of supplies, of storing large amounts.

The drawing annexed explains itself. The dynamite magazine was designed by Mr. John Harris, M. E., Dynamite Instructor to Nobel's Explosives Company, with special reference to the wants of India, and as his knowledge and experience in such matters is second to none in the East, we feel sure that the information to be derived from our illustration will be appreciated by mining managers, engineers in charge of works demanding blasting, and generally where the storage of dynamite and explosives of that nature is required.

The floor of the magazine should be not less than two feet above flood level of the surrounding country, and the floor and walls of the magazine must be swept clean every time it is opened for receipt or delivery. To make it practically fireproof the outer door and the outer shutter should be of half-inch wrought-iron plate, and the frames also of iron. The ventilator hole should be protected by iron grating, built in the wall, four inches from the outer surface, and on the inside by perforated sheet zinc nailed over a wooden frame, built in flush with the plastering.


LIGHTNING CONDUCTOR
⅓ SECTION
⅓ ELEVATION
SECTION ON E F
PLAN
THE INTERIOR OF THE MAGAZINE TO BE PLASTERED SMOOTH WITH BEST PORTLAND CEMENT PLASTER
ARRANGEMENT OF MOVEABLE TEAKWOOD STOOLS FOR STACKING BOXES OF DYNAMITE ON
(NOTE.—ANOTHER ROW OF STOOLS CAN BE PLACED IF DESIRED)
DOUBLE WINDOW
GROUND LEVEL
BOXES OF DYNAMITE

DYNAMITE MAGAZINE FOR TROPICAL COUNTRIES.

FURTHER NOTES ON MATTE SMELTING FOR SILVER.

By O. T. Torrance.

In the ENGINEERING AND MINING JOURNAL of February 8th Mr. F. L. Bartlett comes forward with some notes upon this matte smelting of silver ores, which contain much of the substance of what I had intended publishing some months ago. The disappointment from being forestalled is, however, equaled by the pleasure I feel from the fact that my independent conclusions are so well backed up, not only by the opinion of so eminently successful a metallurgist, but also by the practical results of Mr. Bartlett's experiments. I have still something to say, however, for I am deeply impressed with the idea that matters can be profitably carried much further than has been proposed.

Like Mr. Bartlett, "it has always been my belief that not enough attention has been paid to the smelting of argentiferous ores in blast furnaces without the use of lead," and that "American smelters have not, as a rule, appreciated the idea that silver and gold can be concentrated and saved by the use of sulphur, iron and copper as well as by the use of lead." But, as I have said, I would go further; and I see no reason for excluding lead, as not of use in small quantities, nor for limiting ourselves, in all cases, to the use of blast furnaces.

Briefly, my ideas are that we should certainly be able to concentrate practically the whole of the silver in poor ores, as well as in rich, by smelting with enough of sulphur and iron, with copper or lead or a mixture of these metals, to produce a matte of 6 to 10 per cent. of the weight of ore used. The presence of copper or of lead in small quantities is necessary for the production of a clean slag with a matte rich in silver, because these metals form with great facility a combination of the nature of a double sulphide with sulphur and silver, and these double sulphides are dissolved eagerly by the iron sulphide, while the sulphide of silver alone has much less facility of solution. Copper sulphide is of much the greater benefit in this way; but it is my belief that lead will be found practically successful. The rule appears to be that we should have at least enough, with some excess, of copper or of lead, or both together, to form these double sulphides with all the silver present, otherwisew e should expect very nearly the same results as though no copper or lead were used.

Practically, then, there should be at least as much of these metals as there is of the silver; possibly, with lead alone, two or three times as much. Mr. Bartlett's experiments are, I believe, conclusive as to the power of copper in such small quantities.

Mr. Bartlett also shows that the loss of silver in the slag need not be more than one ounce per ton; and, Mr. Lang's report of the performance of the smelter at Mineral City, Idaho, shows that the practical loss then is only one and one-half ounces per ton of slag when smelting 20 to 24 tons of ore into one of matte, or about double the degree of concentration I have advocated. With a charge made up with more pyrites, which may undoubtedly be had by going deeper, so as to make a ton of matte from 10 or 12 tons of ore, the loss would be decreased to one-half this amount. For, with an equally fluid slag, the loss will in all cases be inversely as the amount of matte made; since the slag will retain an almost uniform quantity of matte, the silver and copper contents of which will be of course proportional to its richness.

If Messrs. Lang & Biddle would smelt for a 10 to 1 concentrate, instead of a 20 to 1, and then thoroughly roast this concentrate and resmelt, with suitable additions of acid ores for flux, to make a 60 to 70 per cent. matte returning these slags to the ore charge, they would save half their present

loss of silver, 40 per cent. of their freight bills and matte, and would increase considerably the smelting capacity of their furnace by means of the fluxing slag. Would it not pay?

It is of ores, comparatively poor in lead and copper that I am speaking—ores which are to be worked for silver mainly, and which do not, as a whole, contain enough sulphurized material to make more than the requisite percentage weight of matte. When the ores available for furnace mixtures contain, collectively, more than the required amount of pyrites, a part of the charge may, of course, be roasted; this being merely an addition of artificially oxidized ores.

I believe that smelting is the cheapest as well as the most effective and perfect means of concentration for all ores which can be worked into a fluxing mixture. Of course there exists too large a proportion of dry ores altogether, but I am endeavoring to present an idea of the practical principles upon which may be based a process for the treatment of a very large proportion of these dry ores by carrying them with ores not hitherto regarded as fluxing, and I am fully persuaded that such a process may be perfected in such degree as to make it, in all its applications, more economical in saving of silver than is any of the wet processes now in use.

The conditions necessary for the working of such a process appear to be:

1. An ore mixture which can be melted.
2. The presence of a sufficient quantity of matte-forming material to separate from the slag.
3. *The presence of an excess of sulphur;* so that the free sulphur may be liberated by the heat in the furnace to combine with any metal which may be reduced from the oxides in the charge or may previously exist in the metallic state.

It is of this last and most important condition, the neglect of which may cause loss or failure, I believe I am here the first to publish a statement. The Welsh smelters, it is true, attend to this matter in their furnace mixtures, but nowhere have I found, in my limited reading, any explanation of, or even any suggestion, that there might be a reason for the practice.

If there be no free sulphur, then any reduced metal must remain in the metallic state, and so be nearly as soluble in the slag as in the matte. The less the quantity of metal so reduced the finer will be its state of division, and the greater the proportionate loss. Gold and silver will be the first and the last free metals. The necessity for the sulphur is apparent. How are we to secure it?

In order to certainly secure this excess of sulphur, a part of the charge must contain raw pyrites, the bisulphide of iron, from which the heat of fusion will liberate just one-half its sulphur.

As the very first business of the roasting process is to drive off or burn up the superabundant sulphur, it is obvious that a charge should never consist entirely of roasted ore. Hence I deem the name "raw smelting" most appropriate for the process here suggested, which is essentially an iron matte process.

Let it be distinctly understood that the sulphides which may remain in partially roasted ore are stable, and will not yield any sulphur to metallic silver or lead, that the decomposition of the sulphuric acid of sulphates cannot be depended upon to furnish sulphur for this purpose, that production or presence of reduced metal will be fatal to success, and that metallic oxides, as of iron, which combine with the slag, do not appropriate sulphur, then the use of the raw ore will be apparent.

The first metals reduced, or those which may already be in the metallic state—gold, silver, copper and lead—will certainly be the ones to appropriate the sulphur liberated from pyrites used as suggested; and, since sulphides are freely soluble in sulphides, these valuable metals may thus be concentrated and saved, and the loss from metallic atomization may be prevented. The formation of iron sows would also be prevented, and the use of the external forehearth might be dispensed with.

In making this presentation of practical facts and principles, limits of space forbid any more extensive details of theory. I have necessarily written in a somewhat disconnected manner, for I am not attempting to describe an elaborated process, but only to offer such ideas and suggestions as have occurred to me as most pertinent and useful, giving especial prominence to such as have been already experimentally proven.

THE WATERS OF THE PASSAIC RIVER AND ITS TRIBUTARIES—A CHEMICAL AND SANITARY INVESTIGATION.

By Henry Wurtz, Ph. D., with the assistance of Durand Woodman, B. Sc.

The following may appear to some, at first thought, as not strictly within the scope of THE ENGINEERING AND MINING JOURNAL. But it is undeniable that questions of water supply and drainage are always placed in the hands of engineers, who, as I would submit, ought therefore to be put into position to weigh the primary chemical questions of original purity, and present and possible future pollution, on which depend both the health of our generation and, far more, that of its coming posterity.

This is my third report on the Passaic River,* made early in 1882, and covering a period of five months, including the fall and winter waters of 1881-82. The delay of eight years in getting these figures before the public—which was unforeseen as well as vexatious—was due to the legal gentlemen acting on behalf of the cities of Paterson and Passaic, for which communities these investigations were made. Their objections have but very lately been withdrawn. A recent attempt made by the small city of Passaic to construct sewers, which would necessarily have emptied into the tideway of the Passaic, led to the obtaining of an injunction by the large city of Newark, which has for a generation or so pumped its own drinking-water out of this tideway, into which its own drainage, twenty times that of Passaic, has been and still is discharged! Appeal to the Chancellor of New Jersey has brought the long imbroglio about the Passaic tideway pollution to what may prove a finality.† Chancellor McGill, in his decision, resurrects, revivifies, and adopts in substance the facts and conclusions of the following long-suppressed report. He, moreover, puts forth the interesting decision that a tideway is State property, to be applied for the common benefit of its riparian population, and that complaints of river pollution, when sustainable, justly apply only to streams above their tidal range. The introduction of my figures into court has also dissolved the injunction of the Paterson lawyers against their publication.

One of my reasons for wishing that these facts and figures be published is that they decide, so far as the Passaic and rivers in like conditions (among which I may say is the Croton) bear witness, a highly important and essential question, long mooted by water analysts. This is as to whether sewage-polluted streams *purify themselves* through natural agencies, in the course of their flow. As a result of my analysis of the Passaic tideway waters made for Jersey City in 1872, I presented as one of my conclusions:—12. "The oxidizing power of this alkaline river water is so great that but slight traces of the sewer matter (*i. e.*, of Newark) can be detected after flowing but four miles through the channel (see *American Chemist*, vol. iv., p. 138). I nevertheless argued strenuously against this pollution, in view of the certainty of future increase. I refer also (ibid., p. 135) to Letheby's curious discovery, that "the death rates of British towns are proportional to the absence of earthy bases from the water supply," and to his argument that these bases are needed for the formation of blood, bones, etc. I then give my own explanation, which seems far more satirfactory: that "these bases are needed by the oxygen dissolved from the air in its work of nitrification and destruction of putrefactive matters." It was at a date subsequent to this, in 1874, that Dr. Frankland, one of the most eminent of British chemists, and especially famous as a water analyst, gave testimony of a purport entirely contrary. Chancellor McGill has cited some of this in his recent decision, namely: that "sewage matter is not perceptibly altered in its character by a flow of seven miles, and scarcely diminished in quantity." Elsewhere Frankland says: "I am of opinion that water which has once been contaminated by sewage or manure matter is henceforth unsuitable for domestic use." Another distinguished British chemist, Sir Benjamin Brodie, takes the same ground most emphatically. He says (with other words quite as forcible): To think to get rid of organic matter by exposure to the air for a short time is absurd.

In spite of all this, my results of 1881, now first made public, confirm, extend greatly, and conclusively establish my former results of 1872. The most important extension is to the waters of the running stream, above tide—the investigations of 1872 relating to the tidal waters only. Other circumstances which confer special value on the following report, are its exceptional extent and completeness, and the exceptional character of the season during which the samples were taken, as set forth in the document itself.

I desire to refer here also to a circumstance announced in newspaper paragraphs of Aug. 5, 1889, and since; to the effect that the Morris Canal is now at length virtually decided upon for Newark, and hereafter, it is stated, also for Jersey City, as a channel of water supply. This measure was proposed to these cities, and strenuously advocated and urged on the testimony of my analyses, in my Report of 1873 (*Am. Chemist*, Vol. iv., p. 323). By this advocacy I brought on myself a singular storm of obloquy, and numerous public accusations of mendacity and even of venality. A chemist of distinction was even induced to write to one of the New Jersey public prints, to the effect that he also had investigated the canal water, and found it so deleterious that the boatmen never allowed their horses and mules to drink it. Careful inquiry failed to give me any basis for this; and subsequent analyses by the chemists of the New Jersey Geological Survey confirmed my own to the full.

[TO BE CONTINUED.]

*My first report on the Passaic waters was made to the authorities of Jersey City in March, 1873, and related to the fall and winter waters of 1872-3. My second report was dated October, 1873, and was made to a joint commission of the Newark and Jersey City authorities, covering the summer waters during June, July and August of 1873. These older reports may be found in full in the *American Chemist*, vol. iv., pp. 99, 133 and 323.

†Since the above was written, I learn, however, that this finality is not yet in sight, the city of Newark having appealed against the Chancellor's decision to another court.

PATENTS GRANTED BY THE UNITED STATES PATENT OFFICE.

The following is a list of the patents relating to mining, metallurgy, and kindred objects, issued by the United States Patent Office.

TUESDAY, MARCH 18TH, 1890.

423,421. Apparatus for Producing Steam, Heat and Light by Electricity. Theophilus D. Farrall, Michigan City, Ind.
423,427. Grab or Clam-Shell Dredger. Edward Y. Harrison, Ballina, Richmond River, New South Wales.
423,431. Clutch Mechanism. William S. Kisinger, Bellevue, Ky., Assignor to Henry G. Stiebel, Cincinnati, O.
423,432. Hydrocarbon Burner. Charles H. Land, Detroit, Mich.
423,440. Cable Railway Apparatus. LaFayette Parker, Davenport, Ia.
423,445. Apparatus for Heating Continuous Lengths of Rods, Wire, Wire Rods, etc. Henry Roberts, Pittsburg, Pa.
423,447. Metal Railway Tie. Percy W. Ross, Los Angeles, Cal.
423,450. Car-Coupling. Burnard A. Shields, Dennison, O
423,497. Blower, Pump, Engine and Meter. Henry Skinner, Gravesend, County of Kent, Assignor of one-half to Philip Francis Oddie, Middlesex County, England.
423,500. Pin-Pulling Machine for Coal Cars. George G. Townsend, Frostburg, Md.
423,502. Grinding and Amalgamating Machine. Thomas W. Watson, St. Arnaud, and Thomas Denney, South Yara, Assignors to the Watson & Denney Gold and Silver Extracting Company (Limited), Melbourne, Victoria.
423,516. Apparatus for Manufacturing Oil Gas. Harry H. Engleman, Defiance, O.
423,532. Car Coupling. Samuel Seay, Jr., U. S. Army.
423,548. Apparatus for Loading Pig Iron. Jerome L. Boyer, Reading, Pa.
423,552. Electric Railway System. Ludwig Gutman, Fort Wayne, Ind.
423,563. Hydraulic Motor. Julian Kennedy, Latrobe, Pa.
423,585. Rotary Steam Engine. Thomas R. Almond, New York, N. Y.
423,586. Railway Cross Tie. John M. Bailey, Goodson, Va.
423,612. Converter. Rodney F. Ludlow, Springfield, O.
423,662. Lubricator. Gilman W. Brown, West Newbury, Mass.
423,694. Wire Rope Grip. Alexander H. Mathesius, Brooklyn, N. Y.
423,716. Apparatus for Deepening Channels or Rivers, etc. John M. B. Baker, Pimlico, County of Middlesex, England.
423,632, 423,733, 423,734, 423,735, 423,736. Method of Welding Metals Electrically. Charles L. Coffin, Detroit, Mich.
423,790. Water-Tube Steam Boiler. Johnson Mills, Prestwich, County of Lancaster, England.
423,791, 423,792. Steam Boiler. Johnson Mills, Prestwich, County of Lancaster, England.
423,796. Method of Forming Concrete Pavements. Edwin F. Murdock, Washington, D. C.
423,826. Apparatus for driving Rod-Mills. Horace F. Smith and William Garrett, Joliet, Ill., Assignors to the Joliet Steel Company, same place.
423,832. Ore-Crushing Mill. Mary A. Stiles, San Francisco, Cal., administratrix of William C. Stiles, deceased, Assignor to the Stiles Mill and Concentrator Manufacturing Company, same place.
423,852. Railroad Tie. Lewis Barnes, Belvidere, N. J., Assignor of three-fourths to William C. Albertson, George M. Shipman and Kerr F. Albertson, all of same place.
423,857. Low-water Alarm for Boilers. Cornelius J. Cronin, Findlay, Ohio.
423,868. Production of Chlorine Gas. Charles Hornbostel, Brooklyn, N. Y.

PERSONAL.

Mr. J. O. Moss has resigned the presidency of the Columbus & Hocking Coal and Iron Company, and H. W. Adams has been appointed his successor.

Will some of our readers furnish us the present address of Mr. E. G. Gaertner, formerly with the Mina la Union at Punta Arenas, Costa Rica, Central America?

Mr. Hall, who for 16 years has successfully managed the Springfield collieries, Nova Scotia, has resigned. Under his careful management the Springhill collieries have been developed. It is understood that he will still reside in Springhill.

Mr. Harry S. Fleming has resigned as general superintendent of the Cameron Iron and Coal Company, of Emporium, Pa., and will leave the company's service April 1st. After this date his temporary address will be Lansdowne, Delaware County, Pa.

Mr. C. E. F. Burnley, superintendent of the mines and coke works of the Cameron Iron and Coal Company, Emporium, Pa., has been appointed general superintendent of the Pocahontas Mines, Virginia, owned by the Southwest Virginia Improvement Company, vice Colonel Dodds resigned.

Messrs. Ledoux & Co., engineers and assayers, who for the last 10 years have had their laboratories and offices in Cedar street, New York, will soon move to new quarters in Phelps, Dodge & Co.'s building, corner of Cliff and John streets. This change is necessitated by the growth of their business, especially in the metal branch, which makes it desirable for them to be nearer the center of the metal trade.

At a recent meeting of the Institution of Electrical Engineers in London, the President announced that Sir David Salomons had made the munificent offer of £1,000 to found a scholarship of £35 per annum, to be held for three years, and to be entirely under the control and at the disposal of the Institution. The Council have gratefully accepted this offer, and have appointed a committee to consult with Sir David Salomons and settle all details in connection with the scholarship.

The "Fulton Club" was organized in 1889 for the convenience of business men down town, principally those engaged in the metal, chemical, leather and glass industries, and has met with the cordial support of representative men in the trades as is evidenced in the rapidly increasing membership. The club rooms occupy the upper part of the Fulton and Market National Bank Building, 81 and 83 Fulton street, and are elegantly furnished. The cuisine is in charge of a competent chef, and the active business man finds refreshment and relaxation amid congenial surroundings. It enables members to make friends of their business associates, instead of simple correspondents.

The first annual election was held on Wednesday, March 19th, and resulted in the election of the following ticket presented by the nominating committee: President, Jordan L. Mott; vice-president, Joshua Hendricks; secretary, Geo. P. Benjamin; treasurer, Alexander Gilbert; directors to serve three years, Eugene G. Blackford, Edward R. Ladew, Herman C. Mechling.

OBITUARY.

Judge Davis, President of the Butte and Boston Mining Company of Montana, died at Boston, Mass., last week.

George Carter, of Eaton, Ind., said to be the discoverer of natural gas in Indiana, died of paralysis the 17th inst., at Martinsville, Ind.

Joseph Eckman, one of the best known iron masters in Pennsylvania, and for nearly 40 years manager of Grubb's furnaces, at Mt. Hope and Columbia, died at Lancaster on the 14th inst., aged 76 years.

George D. Rosengarten, the founder of the extensive chemical works of Rosengarten & Sons, in Philadelphia, died on the 17th inst., aged 89 years. He was born in Cassel, Germany, and came to this country when 18 years of age.

Elisha M. Rule, a well-known mining man, formerly superintendent of the Champion-Donaldson and the California and Kansas mines, of Colorado, died in Central City, Colo., on the 11th inst. Mr. Rule was a native of Cornwall, England, and came to this country about thirteen years ago.

Leonard Everett, a well-known engineer and dredging contractor, died in Lockport, N. Y., on the 18th inst., at the age of seventy years. He was born at Canton, Mass. At the time of his death he was general superintendent of the American District Steam Company, which has plants all over the country.

Daniel M. Fox, ex-Mayor of Philadelphia and ex-Superintendent of the United States Mint in that city, died on the 20th inst. at Atlantic City, N. J. He was born June 16, 1809, in Philadelphia. In July, 1885, Mr. Fox was made Superintendent of the mint, and continued in that office during the ensuing four years, discharging its delicate duties so as win approbation from members of both parties and reflect credit upon the institution, while it proved profitable to the nation.

INDUSTRIAL NOTES.

Messrs. C. R. Gostling & Co., of New Brighton, Pa., have established Crown Cement and Lime Works at Bellaire, O., and will very shortly begin the manufacture of cement.

In the Railway Committee of the Dominion Parliament on the 18th inst. the Detroit River Bridge bill was passed. The measure authorizes the Detroit River Bridge Company to construct a bridge similar to that across the River Tay.

The Archer gas-fuel process has just been put in operation in the Union Mills of the Illinois Steel Company, Chicago, and also in the Pencoyd Steel Works, near Philadelphia, and in both cases it is giving complete satisfaction.

The armor-plate bending machine made by the Niles Tool Works, at Hamilton, O., for the navy yard at Mare Island, Cal., was shipped on the 15th inst. over the Cincinnati, Hamilton and Dayton and Southern Pacific Railroads. The machine was loaded upon eleven specially built and extra heavy flat cars. The two largest castings weighed 66,400 and 66,200 pounds, and the gross weight of the train was 675 350 pounds.

The torpedo boat Cushing was tried on the 13th inst. In the preliminary trial at moderate steam pressure the speed ranged from 2 minutes 47⅜ seconds to 3 minutes 1⅛ seconds per mile. At higher pressure a four-mile run was made in 10 minutes 7⅛ seconds. The fuel used in the trials was Pocahontas coal. The builders, Messrs. Herreshoff, of Bristol, R. I., are to be congratulated on the result, and have well earned the bonus due to them for excess of speed over contract.

Mr. W. F. Patterson, of Pittsburg, Pa., engineer and contractor, has been awarded the contract of erecting the stone piers and approaches of a double-track railroad bridge over the Ohio River at Chaterawha for the extension of the Norfolk & Western Railroad. The iron superstructure of the bridge will be constructed by the Edgmore Bridge Company, the whole to be built at a cost of $1,400,000. The contract calls for the completion of the structure within 15 months, when the new road is expected to be in running order.

The Chrome Steel Works, of Brooklyn, N. Y., has recently made still greater improvement in the manufacture of its adamantine shoes and dies, and the degree of perfection to which they have been brought would be difficult to surpass. The great importance of this improvement to the quartz milling interests of the country will be appreciated most of all by superintendents of mills, and economy is guaranteed to the purchaser who will make a test of them by the Chrome Steel Works.

As the announcement that the Aerated Fuel Company have made the Gilbert & Barker Manufacturing Company, of Springfield, Mass., their general agents for the United States has led many persons to think that the other representatives of the former company had given up their connection with it, these representative wish it understood that they are still the sole licensees for the Aerated Fuel Company's System for the territory assigned to them. All persons interested, therefore, in this system in Southern New York State, Eastern Pennsylvania, New Jersey, Delaware, Maryland, and the District of Columbia, are requested to apply to W. S. Collins, 171 Broadway, New York, who is prepared to put in the system complete, with a guarantee of its success.

The case of the Brush Electric Company against the Julien Electric Company was settled in the United States Court at New York, on the 19th inst., by the decision of Judge Coxe. The suit was brought between two and three years ago by the former against the latter for infringement of several patents relating to storage batteries; the plaintiff claiming every known method of making such batteries. The decision awards to the Brush Company all that is claimed, and gives it the exclusive license for the patent for the whole of the United States during the term of the patents, about 14 years, on the broad claim of mechanical application in any form. The Electric Accumulator Company, and all the other storage battery companies, will now have to take licenses under the Brush patent.

Programme of the deliberations of the International Conference respecting the regulation of work in industrial establishments and mines:

I. REGULATION OF WORK IN MINES.

1. Shall the underground employment be prohibited:
   (a) of children below a certain age?
   (b) of females?
2. Shall a limitation of the hours of labor be provided for in mines wherein the work is particularly prejudicial to health?
3. Is it possible in the general interest to submit to an international regulation of the work in collieries so as to assure regularity in the output of coal?

II. REGULATION OF SUNDAY WORK.

1. Shall work on Sunday as a rule, and save in cases of necessity, be prohibited?
2. What exceptions may be allowed should such a prohibition be issued?
3. Shall such exceptions be determined by international convention, by act of parliament, or administratively?

III.—REGULATION OF CHILD LABOR.

1. Shall children up to a certain age be excluded from industrial labor?
2. How is the age to be determined up to which the exclusion shall operate?
   The same in all branches of industries or differently?
3. What restrictions in the hours of labor and the kind of employment are to be provided in the case of children admissible for industrial labor?

IV.—REGULATION OF THE WORK OF YOUNG PERSONS.

1. Shall the industrial labor of youthful persons who have passed the age of childhood (12) be subject to restrictions?
2. Up to what age shall the restrictions take effect?
3. What restrictions are to be prescribed?
4. Shall exceptions to the general provisions be provided for in individual branches of industry?

V. REGULATION OF FEMALE LABOR.

1. Shall the day or night work of married women be restricted?
2. Shall the industrial labor of all females (women and girls) be subjected to certain restrictions?
3. What restrictions are desirable?
4. Shall exceptions to the general provisions be provided for in individual branches of industry and which?

VI. EXECUTION OF THE PROVISIONS THAT MAY BE AGREED UPON.

1. Shall measures be taken for the carrying out and supervision of the provisions to be agreed upon?
2. Shall repeated conferences be held of the representative of the Governments taking part, and what tasks shall be assigned them?

CONTRACTING NOTES.

Messrs. McKee & Wilson, of Bethlehem, Pa., have received from the East Jersey Water Company the contract for twenty-five miles of steel-plate water pipe of diameters of forty-eight and thirty-six inches, for the pipe line to Newark from the new reservoirs in the Pequannock Valley. The contract calls for a head of 400 feet. McKee & Wilson are erecting a hydraulic plant at Paterson for the manufacture of the pipe.

MACHINERY AND SUPPLIES WANTED AT HOME AND ABROAD.

If any one wanting Machinery or Supplies of any kind will notify the "Engineering and Mining Journal" of what he needs, his "Want will be published in this column.

Any manufacturer or dealer wishing to communicate with the parties whose wants are given in this column can obtain their addresses from this office.

No charge will be made for these services.

We also offer our services to foreign correspondents who desire to purchase American goods, and shall be pleased to furnish them information concerning American goods of any kind, and forward them catalogues and discounts of manufacturers in each line, thus enabling the purchaser to select the most suitable articles before ordering.

These services are rendered gratuitously in the interest of the subscribers and advertisers; the proprietors of the "Engineering and Mining Journal" are not brokers or exporters, nor have they any pecuniary interest in buying or selling goods of any kind.

GOODS WANTED AT HOME.

682. Electric light plant of 300 lights, to be run by water power. Georgia.

683. Boring and turning mill. Georgia.

684. Exhaust steam heater for 50-inch boilers, 16 feet long; exhaust steam pipe, 6 inches; supply pipe from pump, 1½ inches. Kentucky.

685. Corn mill. Tennessee.

686. Machine for sawing slats for crates and orange boxes. Florida.

687. Tank pump complete, with boiler, pipe and fixtures. Florida.

688. Engine and boiler for saw mill. Florida.

689. Driving and matching machine. North Carolina.

690. Engine and boiler, 4 H. P.; also shafting, belting and pulleys. North Carolina.

691. Drill, lathe and patterns for foundry and machine shop. Tennessee.

692. Machine for manufacturing tacks, finish

ing-nails, small brass fasteners, hinges, staples, etc. Georgia.
693. Engine and boiler. Georgia.
694. Two mixers and one sand dryer. Georgia.
695. Pulleys, belting, shafting, etc. Georgia.
696. Brick, three million. Kentucky.
697. Brick machinery. Kentucky.
698. Ice machinery. Kentucky.
699. Ice machine, capacity 1,000 to 2,000 pounds per day. Virginia.
700. Ice machine, capacity 5 tons per day. Arkansas.
701. Water works; want to make an arrangement with a firm to supply machinery, construct the works, and let the town pay a yearly rental until other arrangements can be made. Alabama.
703. Grist mill. Tennessee.
704. Brick machine; medium tempering machine; capacity, 20 to 25 M. Virginia.
705. Water works; stand pipe, steam pump, pipe, etc. Tennessee.
706. Machine for manufacturing insulator pins. North Carolina.
707. Engine and boiler. Arkansas.
708. Dynamo. Arkansas.
709. Hand carts. Michigan.
710. Shaper, iron planer and engine lathe. Tennessee.
711. Lathe for turning shafting, 20 feet between centers. Virginia.
712. Fruit dryer. Georgia.
713. Fruit parers and corers. Georgia.
714. Steam pumps. Georgia.
715. Bellows. Georgia.
716. Feed cutters. Georgia.
717. Wire cloth. Georgia.
718. Boilers or tanks for heating water for bathing room. North Carolina.
719. Patent lime kilns. Idaho.
720. Steam heating apparatus, including boiler, for seminary. Virginia.
721. Engine lathe, about 18 inches swing, very short bed; also one about 20 inches swing, very short bed; equipped with all modern improvements. New or slightly second-hand. New York.
722. Mill to grind green and dry bones, phosphate rock, gypsum, etc. Fine for fertilizers. Pennsylvania.
723. Stone breaker with a jaw about 16 inches wide; also roller crusher, one pair of rolls, about 13 inches diameter. Illinois.
724. Submerged vertical tubular boiler, 10 H. P., with all fittings complete; also steam engine for hydro extractor. Illinois.
725. Engine 40 H. P., and boiler 60 H. P., both complete in every particular. Illinois.
726. Machinery for woolen mill: 20 jean looms of the best make and improved pattern; 3 blanket looms; one 40-inch hydro extractor, with steam engine or for belt connections; corrugating iron roofing to cover roof 80x150; 1 shearing machine for shearing jeans; 1 winding and measuring machine for winding jeans. Illinois.
727. Malleable iron fitting for wrought-iron fences. Virginia.

AMERICAN GOODS WANTED ABROAD.

641. Mining machinery of all kinds. South African Republic.
642. A typewriter or other process for printing music. Queensland.
644. Refrigerators; for household purposes; hard and soft woods. Queensland.
647. Agricultural machinery and farm implements. Tasmania.
649. Nail-making machinery. New Zealand.
702. Brick and tile machinery. Mexico.

GENERAL MINING NEWS.

ARIZONA.

PINAL COUNTY.

SILVER KING MINING COMPANY.—Mr. H. H. Noble, president of this company, returned to San Francisco on the 10th inst. and reports the fire out in the old stopes, with considerable damage done to the boiler by the caving of rock from the winze, which had been in use as a flue. Some tons of rock have been deposited on the level, and work will be delayed until it is removed. The superintendent of the mine is entitled to much credit for the expeditious manner in which he choked off the fire and saved this portion of the company's property from being completely gutted.

CALIFORNIA.

AMADOR COUNTY.

AMADOR GOLD MINE.—According to reports in local papers, the miners have not received their wages, and some weeks ago quit work, and intended to attach the property.

IDAHO MINING COMPANY.—This company claims the first right to the water sent down by the South Yuba Canal Company for power, and the claim not being recognized, a suit has resulted.

ZEILE.—The water has again increased in this mine. This prevents hoisting rock from the main shaft, and consequently twenty stamps of the mill are hung up.

MONO COUNTY.

(From our Special Correspondent.)

BODIE, March 6.

This once famous camp is almost at a standstill just now. Since the death, on the 8th ult., of Mr. A. Pettibone, resident manager of the Standard Consolidated Mine, the only mine working is the Bodie, and that employs but few men.

A new departure has to be made in order to overcome the expense of deep working, and to make the large bodies of low-grade ore in the Bodie mines pay.

A tunnel from Mono Lake Valley would be between two and three miles long. It will tap the mines about 1,000 feet, and if run 200 feet above the flat would have water power to run 100 stamps. If run level with the valley an unlimited supply of wood could be had for $3 or $4 per cord.

After the water had been used for power it could be used or sold for irrigating purposes. Some blind lodes might also be found, as they all tend that way.

But Bodie is not the only mining district in Mono County. Large capital has been invested in every one of the following districts: Prescott, Tioga, Horner, Jordan, Green Creek, and Patterson. Every one of these districts has some mines that prospects show good, and it is probable that operations will be resumed at some of these mines in the spring.

NEVADA COUNTY.

In the suit of the Idaho Company against the Maryland Company, it is now assumed by plaintiff that the true line of the lode is 400 feet north of the line heretofore established. The Grass Valley *Tidings* states that this has for twenty years been regarded as a parallel claim, upon which the companies have parallel locations. Should it be proved that the croppings are not those of a parallel lode, but the true course of the Eureka-Idaho lode and the boundary line fixed in accordance, the Idaho Company will gain and the Maryland Company lose 200 feet of ground; and it is said that from the appearance of the Idaho lower levels this ground is worth a good deal.

GOLD HILL MINING COMPANY.—At a meeting of this company held recently Peter Johnston resigned as treasurer and trustee and A. T. Scott was elected trustee. J. M. Lakenan also resigned as trustee and E. M. Cooper, of San Francisco, was elected to succeed him. Fred. W. Zeile, of San Francisco, was elected treasure. The future meetings of the company will be held in San Francisco. Operations may be inaugurated on the old mine—the first in which a gold quartz vein was discovered in the State—with the termination of the wet season.

SHASTA COUNTY.

Mr. O. J. Johnson, President of the Eureka Tellurium Gold Mining Company, is reported to have stated that the Elgin Reduction Works Company, of Elgin, Ill., has made an offer to put a plant on this property, if upon investigation it is found as represented. This plant would be for the reduction of the tellurium and other refractory ores that may be brought to the works from any part of the county. Bids will be received by the Eureka company for the construction of a tunnel about six hundred feet long.

The Anavena company proposes to run a tunnel three-quarters of a mile in length on its property at or near Clear Creek, in the Muletown mining district.

COLORADO.

CLEAR CREEK COUNTY.

COLORADO CENTRAL CONSOLIDATED MINING COMPANY.—This company filed a bill in the United States Court at Denver a few weeks ago enjoining John Turck and G. W. Cox, owners of an adjoining mine, from draining water into the plaintiff's workings. Judge Hallett, at the time of the filing of the injunction, appointed two competent mining engineers to examine and report upon the cause given in the complaint. This was done and the report of the authorized experts was made the 13th inst. to the court. They found that the plaintiff had ample reason for issuing the injunction. The court thereupon ordered that the cost of the proceedings be taxed against the defendants, and gave leave to the complainant to file a supplemental bill to enjoin defendants from turning water into their property. The bill was filed by the plaintiff immediately after the leave had been granted.

EAGLE COUNTY.

LITTLE CHIEF.—No work has been done in the incline lately at this mine, on Battle Mountain, as the manager has been exploiting the upper ore bodies by a raise 75 feet from the breast of the incline, and, having struck a 4-foot body of carbonates there which is said to run 50 ounces in silver, is desirous of getting it in shipping shape with two drifts on the ore before drifting is resumed in the heading. The ore body is 30 feet above the incline and is in the hill 575 feet. The mine is producing from other sections, and could easily work 75 men, but a tramway is a necessity. Manager Slockett intends to start levels backward and work the ore to the surface. A drift and winze run to the right of the incline opened a body of ore at the 350-foot level, which was abandoned on account of water, and development started on the other side of the incline, and the same ore channel was struck, only dry. It is now producing a sulphate which assays 65 per cent. lead and 14 ounces in silver from a 4-foot body.

GARFIELD COUNTY.

MINING DEAL.—The Tabor Investment Company has secured a lease and bond on the Colorado Central group of mines. This group consists of four full claims. Considerable work has been done, and it is stated that a large amount of galena ore has been exposed. Work will be pushed with a full force immediately. The company has also secured an option on the iron deposits situated a short distance up Avalanche Creek. The claims are to be extensively developed.

GILPIN COUNTY.

BIG SPRING MINING COMPANY.—At the annual meeting of the company, held in Denver recently, the following officers were elected: President, Hon. Charles M. Kellogg; secretary, Alfred Muller; general manager and treasurer, Charles W. Betts. Reports from the mine are good. The shaft is being sunk at the rate of about 10 feet per week, and the ore streak is both widening and increasing in value with depth.

LITTLE JOSEPHINE MINING COMPANY.—The mining controversy between this company and William Fullerton et al. has been concluded in a verdict for the plaintiff after being on trial before Judge Hallett in the United States Court at Denver for nine days.

LAKE COUNTY.

WOLFTONE CONSOLIDATED MINING AND MILLING COMPANY.—The articles of incorporation of this company have been filed by Edwin B. Hendrie, Henry Waterman, Alfred C. Cass, Julian A. Kabler, Charles H. Toll, David V. Burns and William R. Barbour. The capital stock is fixed at $500,000.

PITKIN COUNTY.

ASPEN UNITED MINING COMPANY.—The directors met on the 12th inst., raised sufficient money to pay off the indebtedness of the company and Superintendent Lloyd returned to the mine with money to pay the men and resume work.

COWENHOVEN MINING, TRANSPORTATION AND DRAINAGE TUNNEL COMPANY.—This tunnel, being driven through Smuggler mountain, is making good progress. The tunnel is now in shale. While the shale is very hard, it is so brittle that the shots shatter it and make close timbering necesssry. Mr. H. P. Cowenhoven is the president of the company, and the work is under the supervision of D. W. Brunton.

EDISON.—The new ore bodies that have been opened seem to be as large as those that made the mine famous in the early months of 1889. While the grade of the ore has not been perhaps as high as that of the ore that was shipped last year there is now a decided improvement. At present an upraise is being driven to penetrate one of the new ore bodies so that the ore can be shipped without much handling. When this upraise is finished the car can be run into such a position that the ore will be sent down directly from the stope. It is quite possible that this improvement will enable the management to increase the output until it reaches 75 or 100 tons per day.

RICHMOND HILL MINING AND TUNNEL COMPANY.—Articles of incorporation of this company have been filed. The capital stock is $500,000, divided in shares of $1 each. The incorporators are Fred U. Hugunin, Eugene J. Amann, Gid E. Amann, Rudolph M. Miller and C. A. Miller.

SILVER STAR.—A strike is reported in this mine in Tourtelotte Park. This discovery was made at a depth of more than 500 feet. The ore has been penetrated about seven feet. It is believed that all the ore disclosed will average considerably over 100 ounces. The property lies between the Edison and the Little Rule.

TOURTELOTTE MINING AND DRAINAGE COMPANY—This company it is reported, is aoout to start an extensive tunnel. The object is to tap the following claims: The Cleveland, Harrison, Good Luck, Ohio, Mills, Quay and Blaine. These claims are all in the quartzite just east of the Silver Bell.

ILLINOIS.

ILLINOIS COAL AND COKE COMPANY.—The shares of this company are being dealt in at the New York Stock Exchange. The company has a capital stock of $1,000,000, par $100. It controls 16,500 acres of coal fields, with mines at Reed City, Mapleton, Brown, Hanna, Orchard and Cuba, all within 12 miles of Peoria. The company produces both coal and coke, and is about to increase its ovens to the number of 100. The officers are: P. J. Singer of Peoria, president; G. T. Reed, of Boston, vice-president; W. Jock, of Peoria, secretary; and H. C. Carrick, of Boston, treasurer. E. C. Howlett is general manager and James Stirrot, superintendent, both located at the mines.

MCLEAN COUNTY.

CHENOA COAL COMPANY.—The annual meeting of this company was held at Chenoa on the 6th inst., and the following directors were elected: John E. Wightman, O. D. Sanborn, J. B. Kilpatrick, three years; William Wikoff, two years; William Arnold, one year. E. M. Pike, William Ballinger, C. C. London and W. A. Hayes, hold over. Owing to the mild winter the demand for coal has been light, and the company owes about $8,000. Attachments have been taken out and the shaft has been put into the hands of E. D. Churchill, as receiver.

MICHIGAN.

COPPER MINES.

ALLOUEZ MINING COMPANY.—The important developments at the Centennial have, it is stated, encouraged the directors to consider the question of exploring the Calumet & Hecla vein at considerable depth on that property.

ARNOLD MINING COMPANY.—It is stated that money has been raised to thoroughly develop this mine. A shaft will be sunk at once to test the veiu which is a continuation of the Copper Falls conglomerate.

CENTENNIAL MINING COMPANY.—The agent at the mine reports that rich rock has been taken out of the north shaft. This has an important bearing on developments in that property. It indicates, so those best posted in Lake Superior copper matters assert, that the rich openings which were made on the surface in the Calumet & Hecla vein, at a point in this property where exploration never before had been made, are proving that the vein matter increases in richness as depth is attained. This is exactly as such openings have done everywhere else within the territory of the Calumet & Hecla. The continued richness obtained in sinking this most northerly shaft also tends to confirm the promise of a large and independent shoot of copper equal to a new mine on the north half of the Centennial property.

OSCEOLA MINING COMPANY.—At a meeting of this company, held in Boston on the 13th inst., the board was re-elected as follows: Joseph W. Clark, of Connecticut, A. S. Bigelow, Charles Van Brunt, George F. Bemis, John N. Denison and Gustav Stellwag, of Massachusetts, and John Daniel, of Michigan. Messrs. Clark and Bigelow were re-elected president and treasurer, respectively.

RIDGE COPPER COMPANY.—The annual meeting was held at the company's office in Boston last week, and directors were re-elected as follows: Messrs. H. C. Willis, E. G. Came, M. Newman, Philip Highley and Alfred Meads. It was voted to start operation at the stamp mill as soon as the weather will permit and to develop the mine to as great an extent as the finances of the company will allow. The annual report for the year 1889 is as follows:

The product for the year was 31,969 pounds of copper, which realized		$2,921.52
Received from sale of treasury stock		5,000.00
Balance of assets, per last report		5,440.63
		$13,362.15
Mine expenses	$3,547.68	
Smelting, transportation and all other expenses	2,235.00	
		5,782.68
Balance assets, Jan. 1st, 1890		$7,579.17

The condensed balance sheet, Jan. 1st, 1890, is as follows:

Cash on hand		$7,260.40
" " " at mine		29.93
Supplies at mine		878.61
		$8,168.97
Unpaid dividends	$215.50	
Drafts outstanding	374.00	
		589.50
Balance assets		$7,579.49

The general balance sheet shows cost of property, $203,541; total expenditures to date, $1,175,522.92; total dividend payments to date, $99,784.50; company's stock held at cost, $304.50; cash on hand, $7,260.40; total expenditures to date, $1,486,413.22. Capital stock paid in for the property, $200,000; assessments, $219,938.50; sales of copper to date, $1,044,838.80; sale of treasury stock, $5,000; interest account, collected to Jan. 1, 1890, $16,635.92; total receipts, $1,483,413.32. The percentage of fine copper in Ridge mineral in 1889 was 76,334. The inventory at the mine is given as $4,941.21 for supplies, tools and personal property, $12,110 for machinery; total, $17,051.21.

IRON MINES.

The strike of miners in the Gogebic range, to which we referred in our last issue, has been settled, the miners' demands having been granted.

(Special Correspondence from H. M. Johnson.)

The striking miners and trammers at the Ashland and Norrie mines, to which we referred in our last issue, have resumed work, differences having been satisfactorily arranged to both management and men.

A plan to drain Sunday Lake is being considered, which would give the Brotherton about 13,000 feet more surface, and also improve the Crown Point property. The lake is shallow, having an average depth of about 7 feet, and can be drained at small expense. The Brotherton mine will then sink shafts on this ground and double its present capacity. The ore produced is a high grade Bessemer, and is in demand.

ANVIL.—This mine is now prepared to make a record as an ore producer this year. Developments have been pushed during the winter and the mine is now in excellent shape, financially and otherwise, and will produce about 100,000 tons this year. The east end of the property is also being developed and shows up well. Nearly all the ore mined last year was raised through No. 2 shaft, but Nos. 3 and 4 shafts will do good work the coming season.

BROTHERTON IRON MINING COMPANY.—At this mine work is progressing very satisfactorily, and the Winter contract for 30,000 tons has been nearly filled. Eighty thousand tons of ore have been sold for 1890 delivery, and the production for this year will reach about 100,000 tons.

PENCE.—All the ore mined from the Pence mine in 1889 was raised through the Hennepin mine shaft, the Pence shaft having burned out and caved in from top to bottom. A new shaft is now being sunk about 500 feet west of the old one, and it is expected to be in ore in time to do some shipping this season. The ore produced was of excellent quality, and the vein from 100 to 180 feet wide.

RYAN IRON MINING COMPANY.—The Trimble lease, a five-year sub-lease from the Ryan Iron Mining Company, adjoining the Section 33 mine on the east, has expired, and the property reverted to the company. An assessment of 30 cents per share has been called on the Ryan stockholders, and the property will be developed and made a producer. The Trimble company exhausted the ore in sight, and, being unable to secure an extension of the lease, the property has remained idle for more than a year.

MINNESOTA.

It is stated that the Duluth & Northwestern will start a branch from the Mesabi range northwesterly and run south of Tower to Ely and on to the boundary, where it is believed it will connect with the Port Arthur, Duluth & Western.

MINNESOTA MINING COMPANY.—This company has filed articles of incorporation. It proposes to deal in mineral lands, and to extend through a period of thirty years. The capital stock is $600,000, shares $100 each. The liabilities are not to exceed $100,000 at any time. The incorporators are: Wm. T. Bailey, H. B. Moore, Duluth; Wm. B Parsons, Dodge Center; Frank B. Kellogg and C. A. Severance, St. Paul. The central section of land leased by the company is the section 16, 62-14, and a total of 960 acres comprises the lease holding. The Duluth & Iron Range railroad runs already through a portion of the leaseholdings, and additional tracks will be laid to reach the properties as soon as the snow clears away. The work of developing the property will commence in about a month. The Minnesota Iron Company and the Minnesota Exploration Company are carrying on mining operations on each side of the new mine, and the assays of the ore are of the same standard as the Bessemer product of the former company. The property is about four miles from Lake Vermilion and six from Tower.

ST. LOUIS COUNTY.

CHANDLER MINING COMPANY.—The Chandler mine has now about 72,000 tons of ore in its stock piles, and is making a daily increase of 1,000 tons. The company expects to have 125,000 tons in the stock piles by the first of May, and to ship 350,000 tons the coming season. Judging from the present working condition of the mine, there will be more ore extracted than inany previous year.

MONTANA.

MINAH CONSOLIDATED COMPANY, LIMITED.—This company has been incorporated with a capital stock of $1,250,000, divided into 250,000 shares of $5 each. Stock to the value of $100,000 has been placed in the treasury to be used solely for development work on the mines. The entire capital stock, it is stated, is subscribed for and paid up in cash. The vendors take 75,000 shares at par, and the remainder has been sold at par on the London market. The company has purchased the Minah group of mines, and the first payment of $100,000 has been made.

The property will be operated under the joint management of J. O. Briscoe and John C. Peters. The working force will be increased to 100 men and a concentrator erected at the mine, of 120 tons per day capacity, to work up the second class ore. An electricplant will be put in place immediately. Tunnel No. 4 will be pushed with compressed air drills. The Minah group was opened up by Mr. Briscoe in February, 1886.

BEAVERHEAD COUNTY.

JAY HAWK MINING COMPANY.—This company, which is backed by English capital, is reported to have purchased the Pettingill mining property in the Vipond mining district. This property consists of three mines, developed by shafts from 155 to 250 feet in depth. The ore is free-milling silver, and the company is now shipping in machinery for a new 15-stamp silver mill.

DEER LODGE COUNTY.

MOUNTAIN LION MINING COMPANY.—When the syndicate completed its contract work it had some liabilities, amounting to over $2,000, a part of which operated as a lien upon the company's property and part of which did not. Litigation ensued, the trustees having suits brought against syndicate property to protect the company. Mr. Gable, on the part of the syndicate, made shortly after the conditional proposal that if the company would assume the syndicate debts, the syndicate would transfer to the company title to all property it had at the mine and relinquish all claims to stock in escrow, some 80,000 shares of which had been held by the trustees as forfeited. The proposal was, after mature consideration, agreed to, and the transfers and ratification took place lately at a meeting of the trustees. As a further action it was resolved to proceed to reorganize and place the stock of the company on the assessable basis. The original capitalization of the company was 500,000 shares. Less than 400,000 of these have been issued. It is contemplated in the reorganization to capitalize with 400,000 shares, thus enhancing the value of the stock one fifth, and issue share for share in lieu of the old stock.

THE RED LION MINING AND REDUCTION COMPANY.—At a meeting of this company the following were elected officers for the ensuing year: President, James R. Boyce, Jr.; vice-president, H. W. Spark, treasurer, John H. Curtis; secretary, J. C. Beldin.

JEFFERSON COUNTY.

The smelter at Wickes has closed down and the ores are now sent to Helena for treatment.

MIKADO MINING COMPANY.—A contract has been let for sinking a shaft 100 feet, and drifting 200 on the "South Extension A. M. Holter," owned by this company. A shaft was started on this property last fall and sunk down 37 feet, when water cut short the sinking. The new shaft will be 200 feet south and upon the side of the hill.

SILVER ARROW MINING COMPANY.—This company has been incorporated and articles filed. S. T. Hauser, E. W. Knight, W. A. Chessman, E. W. Beattie, H. Barbour, J. S. Harris, J. S. Hibbard, W. H. Clark, A. A. Southmayd, J. W. Hathaway, and R. C. Wallace. The capital stock is $2,500,000, par value $5 each. The officers for the first three months are: James H. Hathaway, president; E. W. Knight, treasurer; J. H. Hibbard, secretary. Directors—Wallace, Clark, Beattie, Harris, Hathaway, Chessman, and Knight. One hundred thousand shares of the capital stock were placed in the treasury, but a sufficient amount of money was raised, so that a sum was placed in the treasury as a working capital, which enables the company to proceed at once with the work without selling any treasury stock. The company has purchased the Silver Arrow lode and mill site, a patented property situated on Sun River gulch above the low lands or Calvin's rock, and adjacent to the Baby mine, which was bonded not long ago by Marcus Daly for $150,000. The Silver Arrow is opened by two tunnels, one 250 feet long and the other 200 feet deep. The tunnels were run in good ore all the way, and the company expects to ship ore shortly.

WISCONSIN & MONTANA MINING AND MILLING COMPANY.—This company, the organization of which we referred to in these columns on the 1st inst., is to be developed by a 500-foot shaft, to be sunk on the Saginaw lode. The company is said to have $60,000 in the treasury with which to prosecute the work.

LEWIS AND CLARKE COUNTY.

MONTANA COMPANY, LIMITED.—The official reports for February show that the total weight of ore crusshed during the month was 6,195 tons; yield from the three mills, $100,400; working expenses for the month, $51,300. N.B.—The estimated No. of ounces contained in returns by assay are gold, 2,815 ounces; silver, 32,713 ounces. Mr. R. T. Bayliss has arrived in England and will attend the general meeting, which will be held on the 25th instant.

WALL STREET MINING COMPANY.—The listing of this company's stock on the Consolidated Stock and Petroleum Exchange, as mentioned in our issue of the 1st inst., is said to have raised its price to 25c. in Helena. The company's property is situated on the Little Blackfoot.

MEAGHER COUNTY.

CUMBERLAND MINING COMPANY.—This company has, according to reports, bought the Great Eastern property of Chapin & Lewis, for the sum of $50,000.

SILVER BOW COUNTY.

HARRIS FRACTION.—On the 10th inst. this property was bonded, it is stated, for $110,000 to Carter & Owings. This property lies immediately south of the Harris & Lloyd property, purchased by the Boston & Montana Consolidated Copper and Silver Mining Company, and comprises about two-thirds of a full claim extending along the lead for a distance of 1,200 feet. It is developed by a shaft which is now 150 feet deep, but as little drifting has been done, no large body of ore has yet been encountered. According to the conditions of the bond Carter & Owings are to sink the shaft 150 feet below its present depth, and to begin on this work within 40 days. The bond runs for six months, and if not taken up at the end of that time all machinery is to be left on the ground, and all ore taken out is to belong to the present owners. Messrs. Carter & Owings are interested in the sale of the Harris & Lloyd to the Boston & Montana Consolidated Copper and Silver Mining Company, and have now a suit for $20,000 pending for a commission in that sale.

NEVADA.

ESMERALDA COUNTY.

HOLMES MINING COMPANY—The annual meeting of this company was held in San Francisco last week, and the following directors were elected. William J. Sutherland, Ramon E. Wilson, J. E. Condict, A. Judson and Israel W. Knox. The Secretary's report showed an indebtness of $6,000.

At a subsequent meeting of the directors William J. Sutherland was elected president, Ramon E. Wilson vice president, C. E. Elliot secretary and D. H. Jackson superintendent. Work will be started up at once on the property, and an assessment of 25 cents per share has been levied to clear up all outstanding indebtedness.

LINCOLN COUNTY.

PATRIOT SILVER MINING AND MILLING COMPANY.—This company has been incorporated to work the Patriot mine in Yankee Blade district, leased from the Manhattan Company for a period of two years, giving that company a royalty of 10 per cent. on all ores extracted.

STOREY COUNTY—COMSTOCK LODE.

CONSOLIDATED CALIFORNIA AND VIRGINIA MINING COMPANY.—The official returns of the ore crushed and bullion produced during February shows that there were worked at the Eureka and Morgan mill a total of 9,280 tons of ore yielding bullion of the assay value of $202,033.21, of which $106,908.96 was gold and $95,124.25 was silver. The average yield in bullion per ton was $21.77 and the average assay value of the ore per ton was $26.98. In regard to the report there will soon a heavy draft of miners from the ore stopes of this mine. Mr. Charles H. Fish, the president of the company is reported to have said: "We shall keep the present forces at work at long as the ore veins hold out. When they will be exhausted I cannot tell you. I sincerely hope, however, that they will hold out until the winter weather is over for the sake of the men and those who are dependent upon them," The San Francisco *Daily Report* states the bulk of the ore now taken from the Cons. California & Virginia mine comes from the fillings and leavings in and around the old stopes, and this ore is of low grade. It is enriched to a paying value, however, by the addition of a better class of ore, which is taken from various veins which have been discovered within the last three or four years. These richer veins are gradually being exhausted, and the question arises, Shall the Consolidated California & Virginia managers supply the mills with the low-grade ore at a loss when the richer deposits give out; or shall they greatly curtail the yield of the mine when that time arrives and further prospect the mine to see if more good ore can be found? The total yield of bullion during February is of the assay value of $202,033.21.

OPHIR MINING COMPANY.—The official report of the superintendent says that the south drift from the end of the east cross-cut on the 1,300-foot level has been advanced 410 feet, and that the face is showing more quartz, but of low assay value. This drift is nearly up to the California line. It is following the tail end of a vein, the pay portion of which has been worked out in California ground, and if it continues on its present course it will strike into the old timbers which the California people put in up until when the pay gave out they ceased work.

PENNSYLVANIA.

COAL.

Telegrams received in Pittsburg from the Fourth Pool report a strike among the miners for an advance in wages. The men went out on the 19th inst., and work has been abandoned. A strike of 600 coke workers, at Moorewood, was averted by the miners' officials refusing to indorse it. The miners demanded the reinstatement of a discharged employé.

BALTIMORE & OHIO RAILROAD COMPANY.—This company is opening a coal mine in Connellsville. Workmen have been employed there for some weeks, and the pit is now in a considerable distance. The coal is several feet in thickness, and crops out along the face of the entire cliff. The body of coal is about four acres in extent. Four large bins and a tipple have been built, and it is intended to have all the engines of the Pittsburg Division coaled at the mine. Work is now suspended on the mine, as the Rogers heirs claim the company is encroaching on their property.

PHILADELPHIA COAL COMPANY.—A disaster in which two men were killed and another seriously injured, occurred in the Packer Colliery No. 4. The ignition of fire damp was the cause.

OIL.

Exports of refined, crude, and naphtha from the following ports, from January 1st to March 14th, were as follows:

	1890. Gals.	1889. Gals.
From Boston	502,078	660,311
Philadelphia	18,398,963	25,762,810
Baltimore	1,202,754	2,223
Perth Amboy	760,987	2,667,512
New York	73,813,979	80,069,325
Total exports	94,678,761	109,162,181

SOUTH DAKOTA.

BRULÉ COUNTY.

It is reported that another vein of soft coal has been discovered about eight miles from Chamberlain. The coal is of the cannel variety.

According to reports another vein of soft coal has been discovered about eight miles south of Chamberlain, on the west side of the river, in a high bluff largely composed of chalk rock. The coal is of the cannel variety. It burns well and becomes reduced to a white ash. The prospectors have staked off mineral claims, and if the prospects continue favorable steps will be taken for the working of the vein.

VIRGINIA.

SPOTTSYLVANIA COUNTY.

WHITE HALL.—This gold mine, out of which it is said nearly $1,000,000 of gold was taken prior to the war, has lately been reopened by Northern capitalists. Capt. James R. Archer, the superintendent of this mine, reports that they have recently taken out of the shafts $6,000 of gold. The vein of ore being worked by this company is the extension of the Rappahannock Mining Company.

WASHINGTON.

The residents of North Yakima recently raised a bonus of $100,000 to encourage the building of a railroad to connect Central Washington with Portland and San Francisco. It is expected the road will pass through the newly discovered coal fields lying southwest of North Yakima and between there and Portland, and that, after crossing the Northern Pacific at North Yakima, it will extend northward through the Big Bend country to Spokane Falls and British Columbia.

WISCONSIN.

GOGEBIC DISTRICT.

(From our Special Correspondent.)

(*By Telegraph*).

HURLEY, March 19.

GERMANIA.—At half-past eleven last night No. 2 shaft of the Germania mine took fire from some unknown cause at the second level. The shaft boss and pumpman came up, gave the alarm, and returned to get the men out. All the men but five escaped. Among those lost were the shaft boss and pumpman.

While trying to extinguish the fire a cave occurred above the second level, driving the smoke and gas back and down the winzes to the lower level. The list of the men lost is James Thomas, miner; Thos. Thomas, miner, his son; Hugh Waller, shaft boss; James Sullivan, pumpman; Polock Lander. At sixth level an entry was made to the mine through No. 4 shaft at 9 o'clock this morning, and the bodies of Joseph and Thomas Thomas were found in the fourth level suffocated.

No trace of the other men yet. Nos. 3 and 4 shafts are covered. No. 2 shaft is destroyed and the collar caved in. A stream of water is playing on it. Shaft is down to seventh level—this is the pump shaft, and was dry from the numerous stream pipes in it. It was provided with fire hose attached, level tapped into the water column. It will probably be two days before the fire is sufficiently subdued to allow entering the mine.

WEST VIRGINIA.

Work is being pushed building the extension of the Norfolk & Western Railroad. This new line will be built a distance of 237 miles from the terminus of the Elkhorn extension of the N. & W. R. R., in West Virginia, running northwest almost parallel with the Tug Fork of the Big Sandy River, crossing the Ohio at Chaterawha, near Huntington, W. Va., and terminating at Ironton, O. At its terminus it will connect with the D., Ft, W. & C., the Sciota Valley and the Chesapeake & Ohio, which latter it will cross on the southern side of the Ohio River. The road will run through the coal fields of Wayne and Logan and Martin counties, in the southwestern part of West Virginia. These fields are as yet unopened; the Chesapeake and Ohio, which is the nearest line, being too far north to be available. On the completion of the new line, the products of this rich field will have a good outlet, both to the east and the west. The land is nearly all owned by the N. & W. Company. At Tick Ridge, about the middle of the proposed extension, the company will proceed at once with the erection of 5,000 coke ovens, and other preparations are being made for the opening of the field. About 40 miles of the new line have already been laid.

FOREIGN MINING NEWS.

CANADA.

PROVINCE OF ONTARIO.

(From our Special Correspondent.)

Reports from Sudbury state that an agent of an English capitalist, who examined the district last year, has returned for the purpose of putting up reduction works to treat all kinds of ore. The works are to be located on the Soo branch at the crossing of the Vermillion River, where the new townsite of Nickel City is being laid out, and which is likely to be an important point on account of the fine water power there and its proximity to the richest part of the range.

BADGER MINING COMPANY.—This company declared and paid another dividend of 5 per cent. on the capital stock of the company on the 15th ult. This makes $37,500, paid in dividends by this company since January 1st, 1890. Their February shipment consisted of 15 barrels of high grade ore and 13 barrels of concentrates.

CROWN POINT.—Captain Montgomery is sinking and drifting, and developing this property in a very business like and practical way. No stoping has been done lately, but he has good bodies of ore blocked out, so that when stoping commences the Crown Point may be safely counted upon to give a good account of itself.

JARVIS ISLAND MINING COMPANY.—This company offers its entire property for sale by tender. It comprises 6,400 acres, and is partially developed, situated in the townships of Blake and Crook.

SHUMAH WEACHU.—The late developments at this mine have exceeded all expectations, consequently the management and all concerned are feeling jubilant. They have commenced stoping on the two rich blocks of ore reported in my last correspondence. The regular monthly shipments that have been made for some time back will be more than trebled. The stock has gone up from 6s. to 12s. 6d., and is certain to go higher.

STAR MINE.—Captain Roberts is working a small force of men at this location, and the developments give promise of a very productive property. As soon as the railway construction reaches that point machines will be taken in, and active mining on a liberal scale will be inaugurated.

STERLING MINE.—Work is proceeding steadily at this property. The shaft is now down 70 ft. and they are commencing to drift easterly along the course of the vein. The results of the work done on this location so far are very promising. It is owned by Messrs. Stewart and Allen, of Duluth.

BRITISH COLUMBIA.

COAL.

During the year 1889 the following mines have been operated, their respective outputs having been: Nanaimo colliery, 223,870 tons 18 cwts.; Wellington 273,383 tons; Union colliery, 31,204 tons. The total output of the year was 579,830 tons 12 cwts, the coal on hand on January 1st, 1889, having been 10,. 922¾ tons. The exports of these collieries were 443,675 tons; home consumption, 124,574¼ tons, and on hand 1st January, 1890, a little over 22,504 tons. The statement shows the output and export of coal from 1887 to 1889:

	Output. Tons.	Export. Tons.
1887	413,360	334,839
1888	489,000	365,714
1889	579,830	443,675

The following statement shows the various sources, with quantities, of their supply of coal to the State of California from 1887:

	1887. Tons.	1888. Tons.	1889. Tons.
British Columbia	324,949	345,681	417,904
Australia	155,649	271,612	408,002
England and Wales	91,248	126,167	32,890
Scotland	12,615	10,680	12,727
Eastern States (anthracite, etc.)	24,102	30,118	18,950
Puget Sound	569,710	568,918	372,614
Coos Bay and Mt. Diablo	39,155	81,194	87,600
Japan		13,808	1,340
Totals	1,217,428	1,418,208	1,351,957

GERMANY.

It is said that 100,000 German miners now work on the eight-hour system.

The Gelsen Stock Mining Company, which owns nine coal mines in the Ruhr territory, and produces more coal than any other concern in Germany, has just published an abstract from its pay roll to show that the wages of its employés are comparatively high, have increased greatly during the last two years, and that the miners are getting more than their share of the profits resulting from the recent rise in the price of coal on the Continent. The figures are given for the miners proper, "coal cutters" in German, working eight hours per day, and are as follows:

	Jan., 1888.	Jan., 1889.	Jan., 1890
Rhine Elbe	88 cents	90 cents	$1.19
Alma	88 cents	90 cents	1.18
Minister Stein	75 cents	83 cents	1.12
Hardenberg	78 cents	86 cents	1.14
Erin	81 cents	90 cents	1.16
Hansa	77 cents	81 cents	1.01
Zollern	75 cents	79 cents	1.14
Germania I.		75 cents	1.05
Germania II.		81 cents	1.10

The average increase of wages since January, 1888, has been about 40 per cent. in the company's nine mines. The directors of the company say that a corresponding advance has taken place in most of the other mines of the Ruhr territory. In the meantime the price of coal has risen but 25 per cent. These facts, the directors say, dispose conclusively of the complaints of the miners that they are not getting their share of benefits from the boom in coal.

MEXICO.

According to reports from London money has been obtained for building a projected railway from Pachuca, Mexico, to Tampico, Fla., and for the establishment of the first steel works projected in the Republic of Mexico for making steel from native iron. Mr. Richard Honey, who has secured the concession, has long worked iron deposits at Zimpan, on the line of the projected railway, and this iron, which has been thoroughly tested and approved in England, will be manufactured into rails for the new line from Pachuca. The line will have a connection with the City of Mexico over several routes. Three railway corporations are now to enter Tampico—the Mexican Central, the Monterey & Mexican Gulf, and this new line. The work of cutting a channel through the bar at the mouth of the Tampico River will soon be begun by the Mexican Central Railway. Tampico has a fine river, with plenty of water for large steamers.

PITTSBURG AND MEXICAN TIN MINING COMPANY.—The secretary of this company has received word that the furnace erected on the property has

made a run, and the company is daily expecting the first pig, weighing 40 pounds, which is now en route, it is said, to Pittsburg by express. Advices received at the same time say that 500 pounds of metallic tin will be shipped to market shortly. The company expects to have its regular plant erected by July, when the regular runs will commence. The present yield is merely experimental with crude Mexican crushers.

MEETINGS.

Acadia Coal Company, at New York, March 26th at 12 o'clock, noon.

Brownlow Mining Company, at Room 7, Jacobson Building, Denver, Colo., April 12th, at 3 P.M.

Canton Mining Company, at Grand Rapids, Mich., March 29th, at 10 A. M.

Cascade Gold Mining Company, at the office of the company, in Ouray, Colo., April 15th, at 2 P. M.

Consolidated Coal Mining Company, at Denver, Colo., April 1st, at 12 o'clock, noon.

Franklin Mining Company, at 19 Congress, street, Boston, Mass., April 16th, at 12 o'clock noon.

Pueblo Smelting and Refining Company, at Pueblo, Colo., April 7th, at 9 A. M.

DIVIDENDS.

Daly Mining Company, of Utah, dividend No. 37 of 25 cents per share, aggregating $37,500, payable March 31st, at the office of Lounsbery & Co., Mills Building, New York. Transfer books close March 26th.

Homestead Mining Company, dividend of 10 cents per share, aggregating $12,500, payable March 25th, at the office of Lounsbery & Co., Mills Building, New York. Transfer books close March 20th.

Horn Silver Mining Company of Utah, quarterly dividend of 12½ cents a share, $50,000, payable March 31st to stockholders on record March 20th, at No. 56 Broadway, New York.

Little Rule Mining Company, dividend of 2c. per share, aggregating $10,000, payable March 29th, at Room 10, Jacobson Building, Denver, Colo.

Mammoth Mining Company, dividend No. 16, of 10 cents per share, aggregating $40,000, payable March 20th, at the office of the Secretary, No. 251 S. Main street, Room 2 and 3, Salt Lake City, Utah.

Ontario Silver Mining Company, dividend No. 166, of 50 cents per share, aggregating $75,000, payable March 31st, at the office of Lounsbery & Co., Mills Building, New York. Transfer books close March 2d.

ASSESSMENTS.

COMPANY.	No.	When levied.	D'l'nq't in office.	Day of Sale.	Amn't per share.
Butte King, Cal....	1	Feb. 13	Mar. 20	Apr. 12	.03
Confidence, Nev....	15	Mar. 12	April 6	May 7	.75
Crown Point, Cal...	3	Feb. 27	April 2	Apr. 21	.05
Crocker, Ariz.....	8	Jan. 20	Mar. 5	Mar. 28	.10
Drytown, Cal.....	6	Feb. 8	Mar. 9	Apr. 9	.02
East Best & B., Nev.	1	Feb. 11	Mar. 14	Mar. 31	.25
Eureka Con., Nev..	1	Feb. 24	April 5	Apr. 21	.03
Gate City, Dak.....	1	.....	Mar. 15	Apr. 2	00½
Grand Prize, Nev ..	24	Jan. 27	Mar. 5	Mar. 25	.30
Happy Valley, Cal..	6	Feb. 12	Mar. 24	Apr. 14	.05
Holmes, Nev.	11	Mar. 12	Apr. 17	May 8	.25
Martin White, Nev.	23	Feb. 12	Mar. 31	Apr. 30	.25
Mayflower, Cal.....	46	Mar. 8	Apr. 10	May 1	.50
Occidental Con., Nev	5	Jan 20	Feb. 25	Mar. 24	.25
Silver King, Ariz...	4	Jan. 15	Feb. 26	Mar. 27	.30
Standard Con., Cal.	2	Mar. 4	Apr. 16	May 19	.25
Union Con., Nev....	40	Mar. 5	Apr. 10	Apr. 30	.25
Utah Con., Nev.....	9	Mar. 11	Apr. 17	May 5	.25

MINING STOCKS.

For complete quotations of shares listed in New York, Boston, San Francisco, Baltimore, Denver, Kansas City, St. Louis, Pittsburg, Birmingham, Ala.; London and Paris, see pages 351 and 352.

NEW YORK, Friday Evening, March 21.

The mining stock market has been nominally steady, and there is a good feeling so far as reliable stocks are concerned. Business continues as it has been for some time past. We have at various times referred to the lack of animation in the Mining Exchange. Members from time to time say that they look forward to a return of the old days of activity, yet as weeks pass and they are asked if matters are booming, they simply shrug their shoulders and reply, "Nothing new this week."

There has been an unexpected demand for Moulton; 2,200 shares were sold at 33c. We have been unable to ascertain the reason for this sudden spurt. We have been told, however, that there has been considerable outside buying for some time past.

Comstock Tunnel roads show a quotation of $30. North Belle Isle sold at $1.10; Navajo at from 25 to 30 cents. These are the only transactions reported in Tuscarora stocks.

Barcelona was dealt in at 22 and 21 cents.

After many weeks of absence from the list Sebastian appeared at 30 cents.

Brunswick Consolidated Mining Company.—The new company will list its stock within the next two weeks. At a recent meeting of the company held in San Francisco, Mr. H. R. Lounsbery, of this city, was elected treasurer. Since only insiders, and not the stockholders generally can deal in this stock, it is probable that efforts will be used to boom it for all it is worth, and next August when it is turned over to the stockholders, it is only too likely that they will see declining prices and assessments.

Plymouth Consolidated is being neglected altogether at the present time. Quicksilver Common shows a small business at $6.13@$6.38.

The first transaction in the Bodie for several weeks was made in 100 shares in the Bodie Consolidated at 50 cents; Standard Consolidated is down to 15 cents. Sales were made at from 15 to 20 cents.

Sutter Creek was again boomed, and the price advanced from $1.75 to $2.50 on Thursday. To-day sales were made at from $2.35 to $2.40; the total transactions of the week amounted to 11,800 shares. Astoria shows still larger transactions, sales amounting to 17,500 shares, but the price was steady, and ruled all week at 6 cents. Middle Bar and Amador are quietly resting.

Freeland continues to show strength, although in the beginning of the week the price declined from $1.20 to $1.05, and to-day advanced to $1.35. Some 17,500 shares changed hands. There are rumors that the boom in this stock will shortly "peter" out. Adams shows one sale at $1; Little Chief at 30c. Ward Consolidated, which is being neglected at the present time, was quoted at 35c. Lacrosse was firm at 7c.; Robinson Consolidated at 40@42c.

Ontario has come forward with its 166th dividend, and considering the regularities of dividends paid by this grand company it is no wonder that the stock is steadily advancing and has now reached $41. Daly, its neighbor, continues to be in sympathy and has just declared its 37th dividend of 25 cents a share. No sales are being made in the stock in this city. Horn Silver has declared a quarterly dividend of 12½ cents a share. This announcement continues to give strength to the price of this stock, and it has ruled firm at from $2.45 to $2.55. If the favorable condition of this company continue, there may still be a chance of seeing the stock advance to near its former price.

Iron Hill is very quiet and shows but one sale of 50c. Deadwood Terra is neglected. Father de Smet appeared at 35@36c. Caledonia at $2. Homestake shows no transactions, but declared this week its dividend of 10 cents per share.

El Cristo has again had one of its unusual spurts and advanced from $1.30 to $1.65, selling to-day at $1.55.

Nothing was done in Rappahannock until yesterday, when sales were made at 5 and 6 cents. The same prices ruled to-day; it is said that favorable reports from the mine have renewed activity in this stock.

Silver Mining of Lake Valley shows a few sales at 40 and 42 cents. It is stated that these orders come from people living near the mine, and from that it would appear that the prospects of the company are more favorable.

Kingston & Pembroke, which is rarely dealt in at present, shows a few quotations at 55@60c. Mutual Smelting and Mining was strong at from 60c. to $1.70.

Phenix of Arizona opened at 90 cents, and until Wednesday was firm at that figure; later the stock declined to 82 cents, and to-day sold at 81@87 cents. The business was large, and shows transactions of 14,600 shares. Silver King declined from 45 to 38 cents.

There is little variation to report in the Comstock shares, and business is dull. Consolidated California & Virginia, which is one of the favorite stocks, shows a few transactions at from $4.10 to 4.30, but since Wednesday no sales have been reported. Prices of the other stocks remain as last week.

Boston. March 20.

(From our Special Correspondent.)

The better feeling prevailing in copper stocks last week was continued in the early dealings the present week, and it looked as if it would last; but the past three days the market has been quite irregular and inclined to be heavy. The outlook for ingot copper is very strong, and the stocks, both here and abroad, continue to be absorbed, although manufacturers have been carrying very light stocks, with the expectation of getting their supply at lower figures. In this we believe they are doomed to be disappointed, and it is the opinion of those best posted that 16@17c. for lake ingot will be the ruling price in the near future. In view of these facts, we can see no reason for a decline in the stocks of the producing copper companies, but believe much higher prices will prevail as the season advances, and the wise ones are buying the dividend paying stocks as well as those which have a prospective value. Calumet & Hecla sold at $260; but later a few shares, seeking purchasers, were sold at $258@256.

Tamarack advanced to $160, declined to $156, and recovered to $158. There are no new developments in either of these stocks, but both are well established as dividend-paying stocks, and well held for investment. Boston & Montana is one of the most active stocks on the list, and is bound to sell up among the seventies during the coming year, barring accidents. Early in the week good buying orders carried it up to $50¾, and large amounts were sold at about $50. The last three days it has shared in the general depression and declined to $48. We notice one thing, that very little stock comes out on a decline. A gentleman, apt to be right, says that, if copper holds its present price, an extra dividend of $1 is pretty certain to be paid during the year.

Quincy is dull but firm at $72, a gain of $2 over last week.

Osceola was a little less active than last week, but was fairly strong at $30½ in early dealings, but, like some of its neighbors, felt the influence of the dull market later on, and declined to $28½, with a gain of ¼ to $28¾.

Franklin has been quiet but strong, touching $16 to-day and reacting to $15½. The annual report just published is very favorable, and indicates that this old mine is not played out yet.

Atlantic sold at $14, but lost the advance, and declined to $13 for small lots.

Butte & Boston advanced to $15⅝ on the flood, and receded to $14 to-day. A telegram received early in the week stated that shaft No. 1 on the 400-foot level showed a vein of 19 per cent. copper 8 feet wide.

Centennial was very steady at $24 in first dealings. The past few days there has been a pressure to sell the stock, and it was forced down to $21 to-day. We can hear of no good reason for this, as the mine is considered one of the most promising in the lake region, having the possibilities of a Calumet & Hecla in its future. We believe it one of the best purchases on the whole list.

Kearsarge has been the most erratic stock on the list this week. It was very steady up to Tuesday morning at $10¼ to $10½, when a large order to buy stock from lake parties was received, and the effort to fill it carried the price up in about fifteen minutes to $12¼. The order filled, it soon dropped to the former price, which is considered a fair figure to buy it at.

Santa Fe sold up to $1.07½, but declined again to $1, at which price it is a fair purchase. It is reported that the net profits for February were $21,000.

Allouez sold at $3¼ and $3, with very little doing in it.

National sold at $1¾, an advance of ½. Arnold advanced to 40c. The assessment of 10c. per share recently collected is to be used to sink a shaft to test the vein.

There were no sales of Huron this week, but $3½ is bid for it. Late advices from the mine are very favorable, stating that the ground in the southern part of the mine is opening fully as well as was expected, and that the mine as a whole looks better than for a long time. The output, undoubtedly, will show a good increase in the near future.

Silver stocks dull and lifeless. Breece sold at 40c.; Dunkirk at 60c.; Catalpa declined to 23c. asked.

By Telegraph.—Calumet & Hecla $256, Tamarack $157 bid, Boston & Montana $48¼, Kearsarge $10¾, Santa Fe, 95c,, Centennial 20 bid.

Denver.

Prices and sales during the week ending March 14th:

Company.	Opening.	H.	L.	Closing.	Sales.
Alleghany, Colo.....	28	*30	28	28b	2,200
Amity, Colo	15½	*17	15	14b	5,300
Bangkok-C.-B., Colo....	28b	26	26	26b	1,100
Bates-Hunter, Colo	21	23	21	21b	22,000
Brownlow, Colo.....	42	*46	42	43b	6,200
Calliope, Colo.....	45	46	45	45½a	8,200
Clay County, Colo.....	41b	*43	40	40b	1,200
Hard Money, Colo.....	15	*17	15	15b	34,800
Little Rule, Colo.....	50	*52	50	50a	8,600
Matchless, Colo.....	100b	125	100	.....	.....
May-Mazeppa, Colo.....	116	*122	112	112	37,400
Mollie Gibson, Colo.....	40b	40b	40b	.....	
Oro, Colo.....	425b	*625	500	625b	1,500
Pay Rock, Colo.....	10¾	10½	10	10	60,700
Puzzler, Colo.....	24	*26	24	24b	7,500
Silver Cord, Colo...	45b	50b	45b	60a	.....
Whale, Colo	36	*38	35	24b	6,500
PROSPECTS.					
Aspen Mutual, Colo	.....	.....	.....	.....	.....
Big Indian, Colo...	35	*38	35	35½a	5,200
Big Six, Colo...	23b	24	24	25b	5,300
Claudia J., Colo.....	09½	09½	08½	08½	1,500
Diamond B., Colo.....	20	*21	17	†23a	3,700
Golden Treasure, Colo.....	20b	21	21	20b	400
Ironclad, Colo.....	10½	*14	10½	12¾b	88,700
Legal Tender, Colo... . .	09	*11	08½	10¾	21,700
Morning Gem, Colo.....	*48	*50	46	47a	5,400
Natural Gas & O. Co.....	15½	*17	15	*17	34,700
Potosi, Colo.....	31b	*33	31	31b	7,000
Total for the week.....					386,800

* Buyer 30. † Buyer 60. ‡ Seller 60. § Seller 30. a Asked. b Bid.

Lake Superior Iron and Gold Stocks.

(Special Report by David M. Ford, Houghton, Mich.)

NEW YORK, Friday Evening, March 21.

Iron Stocks.—These companies are prospecting mining with great vigor. Large stock piles are being accumulated in the producing mines, and active development work is going on, which will increase the number of producing mines this summer. It is estimated that the output will be very largely increased; the Gogebic range alone claiming to be able to produce about 2,750,000 tons the present season, and the other ranges in proportion. There are two contingencies which may interfere with all these calculations, one of these will perhaps be the difficulty of securing lake carriage, and the other is the possibility and perhaps the probability of extensive strikes among the miners. It is hoped, how-

ever, by judicious action on the part of the companies that the latter may be avoided. The demand for stocks in general has not been quite as active, though there is still a good demand for some of the best stocks, although in many cases there is none of the stock in sight.

Gold Stocks.—At the gold mines everything is running along actively. The Michigan Gold Company are now running through their Huntington mill from 75 to 100 tons of Gold Lake Company's quartz, for the purpose of ascertaining for that company just what their rock will produce by an actual mill run. As this mine is on the next adjoining 40 acres west of the Michigan, and contains the Michigan vein, the result is awaited with some curiosity, as it will show what this vein contains west of the Michigan property.

There is no change in the price of gold stocks, although there still continues to be a good demand for them.

GOLD MINING STOCKS.

Name of Company.	Par value.	Lowest.	High.
Gold Lake Mg. Co	....	.90	$1.00
Grayling Gold & Silver Co	$25.00	.90	1.00
Michigan Gold Co	25.00	$2.50	3.50
Peninsula Gold & Silver Co	25.00	....	.75
Ropes Gold & Silver Co	25.00	2.25	2.50

IRON MINING STOCKS.

Name of company.	Par value.	Bid.	Asked.
Ashland Iron Co	$25.00	$55.00	$65.00
Aurora Iron Co	25.00	7.50	8.00
Champion Iron Co	25 00	$107.00	110.00
Chandler Iron Co	25.00	40.00	42.00
Chapin Iron Mining Co	25.00	30.00	33.00
Chicago & Minn. Ore Co	100.00	115.00	120 00
Cleveland Iron Co	25.00	18.50	19.25
Germania	25.00	11.50	12.00
Jackson Iron Co	25 00	120.00	125.00
Lake Superior Iron Co	25 00	67.00	68.00
Milwaukee Iron Co	25.00	6.50	7.50
Minnesota Iron Co	100.00	83.00	85.00
Montreal Iron Co	25.00	8.00	9.00
Norrie (Metropolitan)	25.00	80.00	85.00
Odanah Iron Co	25.00	20.00	.....
Pittsburg Lake Angeline Co	25.00	170.00	175.00
Republic Iron Co	25.00	48.50	49.50

PIPE LINE CERTIFICATES.

(Specially Reported by Messrs. WATSON & GIBSON.)

The oil market has been on the down grade this week, and the feeling is generally bearish. The Pennsylvania field has been extended, and the fact that Ohio oil is coming prominently into view as a probable illuminant are the bearish influences. Ohio oil, which a few weeks ago sold at 15 cents, is now selling at 27½ cents.

NEW YORK STOCK EXCHANGE.

	Opening.	Highest.	Lowest.	Closing.	Sales.
Mar. 15	89⅝	90⅝	89⅜	90⅝	110,000
17	90½	91	88¼	88¼	156,000
18	88	88	87	88	113,000
19	87⅞	89	87⅞	99	105,000
20	88⅞	88⅞	86½	86½	129,000
21	86	87⅝	86	87½	72,000
Total sales in barrels					685,000

CONSOLIDATED STOCK AND PETROLEUM EXCHANGE.

	Opening.	Highest.	Lowest.	Closing.	Sales.
Mar. 15	90	90¾	90	90⅝	69,000
17	91	91	88	88¼	192,000
18	87¾	88	86⅝	87⅞	287,000
19	87⅞	88¾	87¾	88¾	94,000
20	88⅞	88⅞	86⅛	86¼	149,000
21	85⅞	87¼	85⅞	86⅞	173,000
Total sales in barrels					964,000

COAL TRADE REVIEW.

NEW YORK, Friday Evening, March 21.

Statistics.

Mr. John H. Jones, chief of the Bureau of Anthracite Coal Statistics, furnishes us the following statement of shipments of anthracite coal (approximated) for the week ending March 15th, 1890, compared with the same period last year:

Regions.	March 15 1890.	March 16 1889.	Difference.
Wyoming Region.Tons	254,350	287,823	Dec. 33,473
Lehigh Region "	111,318	96,825	Inc. 14,493
Schuylkill Region "	162,996	123,883	Inc. 39,113
Total	528,664	508,531	Dec. 20,133
Total for year to date	5,175,140	5,760,941	Dec. 585,80

Statement of anthracite coal production for the month of January, 1890, compared with the same period last year. Compiled from returns furnished by the mine operators:

	Feb., 1890.	Feb., 1889.	Difference.
Wyoming Regi'n	951,812.11	1,096,683.05	Dec. 141,870.14
Lehigh Region	374,620.04	449,874.09	Dec. 75,254.05
Schuylkill Regi'n	528,019.16	551,104.13	Dec. 23,084.17
Total tons	1.857,452.11	2,097,6?2.07	Dec. 240,209.16

	Year, 1890.	Year, 1889.	Difference.
From Wyoming Region	2,036 066	2,413,417	Dec. 377,351
From Lehigh Region	861,465	986,860	Dec. 125,394
From Schuykill Region	1,241,499	1,319,914	Dec. 7 ?,414
Total tons	4,139,031	4,720,19?	Dec. ?81.16?

The stock of coal on hand at tide-water-shipping points, February 28th, 1890, was 1,148,379 tons: on January 31st, 1890, 1,138,927 tons; increase, 9,452 tons.

PRODUCTION OF BITUMINOUS COAL for week ended March 15th and year from January 1st:

EASTERN AND NORTHERN SHIPMENTS.

Tons of 2,240 lbs.	1890. Week.	1890. Year.	1889. Year.
Phila. & Erie R.R.	1,572	28,957	19,328
Cumberland, Md.	57,200	777,569	579,908
Barclay, Pa.	3,275	27,796	30,003
Broad Top, Pa.	9,562	118,400	92,979
Clearfield, Pa.	73,089	863,851	677,653
Allegheny, Pa.	20,022	231,177	188,374
Beach Creek, Pa.	40,415	386,606	294,455
Pocahontas Flat Top.	32,608	363,752	319,986
Kanawha, W. Va.	46,381	400,674	354,003
Total	284,124	3,198,784	2,556,689

WESTERN SHIPMENTS.

Pittsburg, Pa	20,455	189,661	130,421
Westmoreland, Pa.	32,696	388,984	345,387
Monongahela, Pa.	5,971	40,317	33,623
Total	59,122	628,962	509,431
Grand total	343,236	3,827,746	3,066,120

PRODUCTION OF COKE on line of Pennsylvania R. R. for the week ending March 15th, and year from January 1st, in tons of 2,000 lbs.: Week, 115,322 tons; year, 1,173,248 tons: to corresponding date in 1889, 943,135.

Anthracite.

"Nothing new" is the stereotyped answer the ENGINEERING AND MINING JOURNAL reporter receives in reply to his query as to the condition of the trade; and, indeed, no better words than these can be found to express the actual state of affairs. Considering the many obstacles, however, the anthracite coal trade has had to overcome during the past fifteen months, it is to-day in a pretty healthy condition, and it only remains for prompt and decisive action on the part of the producers to again place it in a state of prosperity. It is unquestionably true that nowhere are consumers overstocked, and as prices have about reached bottom, a firm and strict adherence to any schedule that may be agreed upon will quickly restore the confidence of buyers and impart strength to the market. Most of the companies are now curtailing their production, and although stocks at tide water are steadily increasing there is no more coal being shipped here than is absolutely necessary. The furnaces throughout the country have to be supplied, and in filling these orders a considerable amount of the domestic sizes of coal is produced that has either to be disposed of at the best prices obtainable, or be shipped to the stocking points at tide water. Another meeting of the sales agents of the different companies will be held on the 27th of this month, and it will afford the ENGINEERING AND MINING JOURNAL much pleasure to place upon record that they have met these perplexing questions fairly and agreed upon some programme that will ultimately result in an improved condition of the trade. Pea and buckwheat continue in good demand, a few of the companies being unable to satisfy all the inquiries they receive. We may continue to quote as ruling prices: Broken, $3.40; stove and egg, $3.50 f.o.b.; chestnut is selling at $3.25, alongside; and pea and buckwheat are in demand at $2.85@$3.10, and $2.25@2.40, respectively.

The New York Retail Coal Trade.

The Retail Coal Exchange will hold its regular meeting this evening at eight P. M.

The Board of Trustees will present at this meeting the plan which they have had under consideration for some time, to be known as a "Building Fund" and which has reference to the purchasing of a building for the uses of the Exchange. Arrangements will also be completed for the third annual excursion which is to take place previous to the 10th of June.

Bituminous.

Prices show but little impovement in this market, although there is an active demand and some of the companies are no longer bidding, having contracted for several months ahead. There is undoubtedly enough coal available to satisfy any urgent inquiries that may be received, and we do not anticipate an immediate advance in values. The syndicate or pool is now a thing of the past, and the companies will be governed by the same arrangements that ruled last year. We no longer hear complaints of the inadequacy of transportation facilities, and it is to be hoped that this disagreeable feature of last year's trade has been entirely removed. The competition of pea coal in the Boston market has led many of the companies to reduce their already low rates, besides guaranteeing freight at $1 per ton to the market named. Considerable interest is being evinced by the producers in this city as to the probability of a strike on the 1st of May of the miners in the bituminous coal fields that supply the Western and North western markets. A great many, however, share the opinion of the ENGINEERING AND MINING JOURNAL that there will be no such strike, as the miners are perfectly familiar with the very unsatisfactory condition that the bituminous coal trade has been in for the past two years, and they seem to realize that there is nothing to gain, but much to lose, by a strike. Representatives from the different roads, carrying coal to the western markets, have held several meetings recently with a view to establishing the usual rates of toll. Nothing definite has as yet been accomplished, although it is expected the question will be amicably settled. Their next meeting will be held in Cleveland.

Chicago.

March 19.

(From our Special Correspondent.)

To find something new to report in connection with the Chicago coal market since last week is an utter impossibility. This topic is worn threadbare. The close of another week finds the situation practically unchanged. It appears to be a waiting game at this point, and dealers are looking New-York-ward for quotations for the spring trade. It does not appear probable that any change will take place until action is taken East in regard to fixing prices.

The business, however, under existing circumstances has been a satisfactory one so far this month and dealers have unloaded a considerable quantity of coal.

The all-round price for anthracite, at retail, we continue to quote at $6 per ton.

For large and small egg we quote at $4. Range and chestnut at $4.75, on dock; on wheels, 25 cents additional.

Boston.

(From our Special Correspondent.)

The anthracite coal market is in an unchanged condition. Business is very light. Opinions differ as to the future. Some think that the outlook is for a better market, while others hold that the companies cannot continue to suffer such great restriction as they are now under, and that lower prices are ahead. Just now the market is in a very queer state as to f. o. b. prices. Pea coal is very scarce and hard to get, because of restriction of mining. Broken coal is also fairly well sold up, because of the line trade for this size, but there is a glut of egg and stove, save in special varieties. Buyers can name their own terms for hard white ash, egg or stove and name them low, too.

The bituminous market is unchanged. Contracts are being made on a basis of from $3.50@$3.75 delivered. Cumberland coal seems to be at a serious disadvantage by reason of the Baltimore & Ohio tolls. There is no money in Cumberland coal, it is claimed, at less than $2.50 f.o.b. and as competition now runs, there is only a limited demand for the coal at this price. It is said that Cumberland coal is being sold at less than $2.50, but the proof of such transactions has not been made public. Clearfield shippers have taken on a large business.

Freights are steady, quoting New York 65@75c.; Philadelphia, $1.10; Baltimore, $1.20. Retail trade is without important movement.

The receipts of coal at this port for the week have been as follows:

	For the week. 1890. Tons.	For the week. 1889. Tons.	For the year. 1890. Tons.	For the year. 1889. Tons.
Anthracite	16,141	11,908	148,780	135,475
Bituminous	19,971	26,304	157,348	159,283
Total	36,112	38,212	306,128	294,758

Buffalo.

March 20.

(From our Special Correspondent.)

Dealers exhibit some little anxiety to know what the opening rates of anthracite coal will be, but no intimation has been made public of what the next meeting will do in the matter. The anthracite trade here is dull and without features of interest.

Bituminous coal quiet and nominally unchanged. Supply adequate to demand.

Coke quiet; average business being done.

Messrs. Bright, Dowdell & Co., of this city, are fighting our Car Service Association. They maintain that the charges on several cars of coal received by them at Black Rock were unjust. "A standing order was given the New York Central & Hudson River Railroad to send all their coal to Canada," they say, "but this particular consignment was held because the freight was not promptly paid. The postal notice of arrival of the coal was not received in time to prevent car service charges."

The Erie Railroad, during the coming season of lake navigation, will connect with the Northern Line of propellers and also with the passenger boats of Ward's line. By the former arrangement the Erie obtains a direct route to Minnesota and the Northwest.

The Hocking Valley Coal and Iron Company is expending large sums at Toledo, O., in improving its coal docks to give extra facilities for handling of fuel and prevent the overcrowding of vessels.

Representatives of the coal carrying railroads of Ohio and Pennsylvania met at Chicago last week to fix freight rates from the mines to the lake ports for the coming season of navigation. Through some trouble among those present, the meeting adjourned till Monday last, at Cleveland. No agreement was reached, and the matter will be tackled again next Tuesday, at Columbus, O. The prospects for a settlement are said to be slight; and, if a satisfactory result is not arrived at, the knowing ones say "Look out for a big coal war the coming summer!" The Ohio railroads demand that the rate from the Ohio coal fields should be 25 cents lower than from Pittsburg, instead of five

cents lower, as was the difference last year. The owners of thin vein mines say that they cannot compete against the owners of thick vein mines.

The prospects are a little brighter that the Buffalo harbor appropriation asked for will not be cut down to $200,000 from $400,000. Captain Mahan, the engineer in charge, was called to Washington, and he thoroughly explained the necessity of the grant of the sum asked for, and "made an impression" on the House Committee on Rivers and Harbors.

The Cleveland, O., *Leader* says: "Coal men are showing considerable activity, and from two to six charters are being made every day, but are kept quiet. Sixty cents is being paid freely to the head of Lake Superior and to Milwaukee and Chicago. Vessel men are asking 65@70c. for coal to Chicago, but have not yet succeeded in obtaining it."

The tonnage of anthracite coal shipped from Erie, Pa., by water during the year 1889 was 258,560 net tons, namely, 29,589 to Lake Superior ports; 13,436 to Lake Erie ports, and 215,535 to Lake Michigan ports.

Senator Cullom has introduced a bill to amend Section 12 of the Inter-State Commerce act so as to provide that the Commissioners shall have authority to inquire into the management of the business of all common carriers, and shall keep themselves informed of the method in which the same is conducted; upon the request of the Commission, the District Attorney to whom it may apply may, under the direction of the Attorney General, begin all necessary proceedings for the enforcement of the provisions of the law, and for the punishment of its violators.

Pittsburg. March 20.

(From our Special Correspondent.)

Coal.—No change has taken place since our last. The Monongahela mines are all in full operation at prices for mining that were current on the resumption of mining. The shipments to Cincinnati and Louisville reach 3,600,000 bushels. The principal portion goes to the Southern markets.

The nominal prices are:

Per 100 bushels.		Per 100 bushels.	
1st pool	$4.75	3d pool	$3.90
2d pool	4.50	4th pool	3.25

Railroad coal, $5.00@$5.50.

Connellsville Coke.—The situation shows no actual change. Cars continue scarce; shippers on that account experience considerable difficulty, cutting down shipments materially; week's shipments, 5,714 cars; decline, compared with preceding week, 495 cars; shipments to points west of Pittsburg, 3,425, a falling off of 50 cars; to points east of Pittsburg, decline, 225 cars. Pittsburg shipments fell off 125 cars. The region output was 112,855 tons; week's decline, 8,856 tons.

Current rates: Furnace f.o.b. on cars at works, $2.15; Foundries, $2.45; Crushed, $2.65. Freights show no change. Pittsburg. 70c.; Mahoney and Shenango Valley, $1.35; St. Louis, $3.05; Chicago, $2.75; Cleveland, $1.70; Cincinnati, $2.65; Louisville, $3.20.

FREIGHTS.

Reports from Cleveland state that five unsuccessful meetings have been neld to fix coal rates from the Pennsylvania and Ohio mines to the Lake ports. The sixth and final meeting will be held at Columbus next week. The outlook for an agreement is said to be poor.

From Baltimore to : Boston, Mass., 1.10; Charleston, .80@.85; Fall River, 1.10; Galveston, 3.00; New Bedford, 1.05@1.10; New Haven, 1.05@1.10; New London, 1.05@1.10; New York, N. Y., 1.05; Portland, 1.10; Portsmouth, N. H., 1.10@1.15; Providence, 1.10; Salem, Mass., 1.10; Savannah, 1 90; Williamsburg, N. Y., 1.05.

From Philadelphia to: Alexandria, †.85; Annapolis, †.65; Baltimore, †.60; Bath, Me., †1.05@†1.15; Beverly, †1.00@†1.10; Boston, †1.00@†1.10; Cambridge, Mass., †1 10@†1.20; Cambridgeport, †1.10@†1.20; Charleston, .70; Charlestown, †1.10@†1.15; Chelsea, †1.00@†1.10; Com. Pt., Mass., †1.10@†1.15; E. Boston, †1 00@†1.10; E. Cambridge, †1.10@†1.20; Fall River, †1.00; Galveston, 2.50; Gloucester, †1.05@†1.15; Lynn, †1.10@1.20; Marblehead, †1.05@†1.15; New Bedford, †1.00; Newburyport, †1.25; Norfolk, Va., .70@.80; Portland, †1.00@†1.10; Portsmouth, Va., .70@.80; Portsmouth, N. H., †1.10@†1.20; Providence, 1.00; Richmond, .80@.90; Roxbury, †1.00@†1.10; Salem, †1.00@†1.10; Savannah, .90@1.00; Somerset, †1.05@†1.15; Washington, †.85; Weymouth, †1.10@†1.20; Wilmington, N. C., 1.00.

* And discharging. † Alongside. ‡ And towage.

METAL MARKET.

NEW YORK, Friday Evening, March 21.

Prices of silver per ounce troy.

Mar	Sterling Exch'ge.	Lond'n Pence.	N. Y. Cts.	Mar	Sterling Exch'ge.	Lond'n Pence.	N. Y. Cts.
15	4.84	43⅞	95¼	19	4.84½	43¾	95
17	4.84	43⅞	95¼	20	4.85	43¾	95
18	4.83¾	43¾	94⅞	21	4.85	43¾	95

Council Bills have declined ⅛d. this week.

Silver market has been fairly steady, without special feature.

The United States Assay Office at New York reports total receipts of silver for the week to be 120,000.

Foreign Bank Statements.

The governors of the Bank of England at their weekly meeting on Thursday made no change in its rate for discount and it remains at 4 per cent. During the week the bank gained £349,000 bullion, and the proportion of its reserve to its liabilities was raised from 51·03 to 51·48 per cent. against a gain from 42·09 to 42·23 per cent. in the same week of last year, when its rate for discount was 3 per cent. The bank, on the 20th inst., gained £19,000 bullion on balance. The weekly statement of the Bank of France shows gains of 425,000 francs gold and an inrease of 3,550,000 francs silver.

Domestic and Foreign Coin.

The following are the latest market quotations for American and other coin:

	Bid.	Asked
Trade dollars	$ .76	$ 78
Mexican dollars	.74½	.76
Peruvian soles and Chilian pesos	Nom'al.	Nom'al.
English silver	4.83	4.88
Five francs	.94	.95
Victoria sovereigns	4.86	4.88
Twenty francs	3.86	3.90
Twenty marks	4.74	4.78
Spanish doubloons	15.55	15.70
Spanish 25 pesetas	4.82	4.88
Mexican doubloons	15.55	15.70
Mexican 20 pesos	19.50	19.60
Ten guilders	3.96	4.00
Bar silver	.95¼	.96

Copper.—The market has had a little surprise sprung upon it during the last week, owing to it having transpired that the bankers have sold some three million pounds of lake copper to consumers at 14c. per pound. They are, however, not offering anything more at that price, but are now asking 14½c. The effect of the salc has not been to weaken the general market in any way as the producing companies being well sold ahead can afford to regard the action of the bankers with complacency, and as (with the exception of the bankers' holdings) there are no other stocks of copper in second hands, the reduction of the bankers' stocks at the present time ought really to have the effect of strengthening the position.

Under these circumstances quotations are steadily maintained at 14¼@14¼ for Lake, 13@13½ for Arizona refined, 12⅝@12⅞ for casting sorts. The London market for Chili Bars and G. M. B.'s has been very steady during the week, the fluctuations having all been within the extremes of £47 2s. 6d. to £47 5s. spot, and £47 10s. to £47 12s. 6d., the lowest quotations marked, and £47 15s. to £47 17s. 6d. spot, £48 5s. to £48 7s. 6d., the highest, the latter being to-day's closing prices, as received by cable. Reports from Europe are still to the effect that fine copper continues very scarce, and the abnormal difference in values between such refined sorts and the raw material still prevails. The latest quotations for such sorts are: English tough, £52 to £52 10s.; best selected, £54 to £54 10s.; strong sheets, £60 10s. to £61; India sheets, £57 10s. to £58; yellow metal, 6d.

For the first fortnight in March, the statistics of visible supplies show a decrease of 3,000 tons, which is a very favorable indication, and this decrease is pretty equally divided between fine copper and Chili bars, while the charters also show a decrease of about 1,000 tons.

The following statement, compiled by Messrs. Henry R. Merton & Co, of London, will be of interest to our readers, showing as it does the principal copper supplies of the world and the sources of such supplies for the years 1889 and 1888:

COUNTRIES.	1889.	1888.	COUNTRIES.	1889.	1888.
	Tons.†	Tons.†		Tons.†	Tons.†
Algiers	160	50	Norway:		
Argentine Republic	190	150	Vigsnaes	1,007	1,020
Australia	8,300	7,450	Other Norwegian	250	550
Austria	800	1,010	Peru	275	250
Bolivia—			Russia	4,070	4,700
Core-coro	*1,200	1,450	Sweden	*1,000	1,036
Canada	*2.500	*2,250	Spain and Portugal:		
Chili	24,250	31,240	Rio Tinto	*32.000	29,700
C. of Good Hope:			Tharsis	*11.000	*11,000
Cape Copper Co	5,600	5,800	Mason & Barry	*5,250	*7,000
Namaqua Copper Co	*1,800	1,700	Servilla	1,350	1,709
England	1,500	1,456	Portugueza	*900	*900
Germany:			O'h'r mines	*6,500	*7,000
Mansfeld	15,506	13,380	U. S. of America:		
Other German	*1,850	*1,850	Lake Superior	38,769	38,650
Hungary	300	858	Montana	46,518	43,703
Italy	*3,500	3,5 0	Arizona	14,419	14,062
Japan	15,000	11,600	O'h'r States	6,068	5,295
Mexico:			Venezuela:		
Boleo Co	3,280	2,566	New Quebrada	5,563	4,000
Other Mexican	500	200			
Newfoundland:					
Betts Cove	1.115	1,300	Total production	262,990	259,126
Tilt Cove	700	759			

Average of Prices on the 1st of each month: Chili Bars £82 7s 6d; G. M. Bs. 76 } £49 10s 6d

*Estimated. †In English tons of fine copper.

Tin.—The market for tin has developed rather a weaker tendency, especially for near deliveries, which toward the close of last week marked a considerable rise, owing to rumors of disaster to the S. S. "Egypt," which vessel is bringing about 300 tons of tin to this port. It being now generally believed that this vessel will come in all right and only a day or two behind time, prices of spot and March tin have fallen back again to a more normal level. Business during the week has been very restricted, and the closing quotations are spot 20.45, March 20.40, April 20.00, May 20.20, June 20.20.

The London market has also been quiet, with unimportant fluctuations within a range of about 10s. a ton, and the closing quotations to-day are £90 2s. 6d.@£90 5s. spot, and £90 15s.@£91, three months.

Lead.—After the recent announcement that the Committee on Ways and Means had decided to recommend a tariff of 1½c. per pound on lead contained in imported silver lead ores it was quite a disappointment to many people that the market for pig lead did not respond with a rise, but, on the contrary, showed a tendency to decline, and prices actually did give way, closing to-day about five points below the last prices of a week ago. It is quite evident that the recommendation of the Ways and Means Committee on the Tariff will meet with strong opposition, not only on the part of the Democratic party generally, but also from an influential portion of the Republican party, and under these circumstances the body of traders are not disposed to place much faith in any "recommendations," as this kind of thing has been going on so long, with constantly conflicting rumors and reports, that nothing will now produce much effec until Congress take some decided action on the subject.

Offerings from smelters have been rather heavier during the week and they are evidently more disposed to meet the market. The closing quotations to-day are 3·95 for spot and March, and 4 for April, May and June. The London market continues quiet and the latest closing quotations are £12 7s. 6d. for Spanish and £12 12s. 6d. for English lead.

The St. Louis Market.—Messrs. John Wahl & Co. telegraph us as follows: Lead is quiet, but reasonably firm. Offerings continue light, and we might say that the demand is equally so. Sales will probably not sum up more than 400 tons, at, say, 3·75c. for common, and 3·77½c. for corroding.

The Chicago Market.—Messrs. Everett & Post telegraph us as follows: Considerable apathy continues to be shown by consumers, so that few transactions have been made during the week. In a limited way sales are reported at 3·80c. to 3·85c., which latter figure is the asking price at the close.

Spelter is still a very irregular market, and the transactions are exceedingly limited. The present quotations are 5·15@5·20 for prime Western.

Antimony. Stocks are very low, and fresh arrivals go into consumption almost immediately, consequently values are well maintained, and we quote Hallett's at 19¼@19½c., while Cookson's is even higher again at 26@27c.

Nickel.—The scarcity which has been felt during the last few weeks continues, and early deliveries command full prices. We quote 70c.

Quicksilver.—New York quotations are $49 50@$50, and in London they are £9 10s.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, March 21.

Pig Iron.—The stagnant condition of the iron market continues. Some dealers here say that the reduction of price in the Southern product has not affected them, but it certainly seems to have had some effect on buyers, who are holding off. We hear of sales of 2,000 or 3,000 tons of No. 1 foundry iron (Southern), but this seems to have been sold principally to jobbers. Northern iron is nominally for No. 1 X, $19@$19.50; No. 2, $18 50@$19, and Southern No. 1 foundry has been offered at $18.25 @$18.50.

Scotch Pig.—A few sales are reported, but there is really nothing new to say in regard to Scotch pig. Quotations are for Eglinton $20.50; Dalmellington, $22.50@23, and Coltness, $25.50.

Spiegeleisen and Ferromanganese.—There is nothing worthy of mention to report. For 20 per cent. spiegel quotations are $35; for 80 per cent. ferromanganese $85@$95, according to time of delivery, is asked.

Steel Rails.—A slight reduction in prices has taken place, and we may quote $34@$35. The market is weaker, and we hear of no large sales having occurred during the week.

United States Consul-General Sutton at Nuevo Laredo, Mex., has reported to the State Department that 25,000 tons of American steel rails have been recently imported into Mexico for use in the construction of the Monterey & Mexican Gulf Railway. He says the president of the road informed him that the cost was less than it would have been on the same quantity of European rails of the same grade, and the Consul congratulates the country

on the transaction, as being the first successful competition in Mexico with the European product.

Structural Iron and Steel.—We have nothing new to chronicle in this department, and quotations have not materially changed. Current prices are as follows: Bridge plate, delivered on wharf, 2·25c.; iron angles, 2·25c.; iron tees, 2·75@2·85c.; steel angles, 2·70c.; beams and channels on wharf, 3·1c. Steel plates on wharf: Tank and ship, 2·75c.; shell, 3c.; flange, 3·25c.; fire-box, 4@4·1c. Iron plates on wharf: Common tank, 2·30c.; refined, 2·40c.; shell, 2·55c.; flange, 3·5@3·7c.; extra flange, 3¾@4c. Bar iron at mill is quoted at 1·9c. for common, and 1·9@2c. for refined. Deliveries from store are quoted as follows: Common, 2·1c. base; refined, 2·3c. base; "Ulster," 3c. base; Norway bars, 4c.; shapes, 5c., and Norway nail rods, 5½c.

Merchant Steel.—Business in merchant steel shows a slight improvement, but prices remain unaltered. We continue to quote: Best English tool steel, 15c. net; American tool steel, 7½@10c.; special grades, 13@20c.; crucible machinery steel, 5c.; crucible spring, 3¾c.; open-hearth machinery, 2¾c.; open-hearth spring, 2¾c.; tire steel, 2¾c.

Rail Fastenings.—We can only continue to quote nominally as in our last issue: Spikes, 2·25c., angle fish-plates, 2·15@2·25c.; bolts and square nuts, 3c.; hex nut, 3·25c.

Tubes and Pipes.—These articles remain unchanged in price. The demand is slightly better than for some time past. We continue to quote as follows: The ruling discounts on car lots are 47½ per cent. on small black, 40 on galvanized, 60 on large orders of black and 47½ on large lots of galvanized; 45 on 1¾-inch boilers, 50 for 2 to 4-inch and 52½ on larger than 4-inch; casings all sizes, 50 per cent.

Old Material.—Quotations in this are merely nominal. Buyers could probably obtain prices for old rails ranging from $24.50@$26.

Cleveland. March 20.

(From our Special Correspondent.)

There is still no apparent change in the situation of the ore market. Inquiries and sales are few, and as there is little ore to sell, prices remain unchanged.

The strike at the Norrie mine referred to last week has been settled, but a fire is now raging in the Germania mine, which will occasion considerable loss, and if not soon gotten under control, will curtail in some degree their product.

Letters from Sault Ste. Marie indicate that the river will not be open for navigation before April 20th. It therefore seems quite likely that navigation between the lower lakes and Lake Superior and Lake Michigan will not commence much, if any, sooner than usual.

There have been some rumors lately about the establishment of an ore exchange in Milwaukee. I learn, however, from prominent iron men and bankers at Milwaukee, that nothing of the kind is going on there, and that what has been said about the matter was nothing more than rumor, which may have arisen from chance conversations between Milwaukee men, who would doubtless like to have their city take a more prominent position in the Lake Superior iron ore business.

Quotations remain the same, and are as follows:

SPECULAR AND MAGNETIC ORES.

Bessemer	66@69 per cent.	$6.75@$7.50	
"	60@64 "	5.25@ 6.50	
Non-Bessemer	66@69 "		6.00
"	62@65 "	5.25@ 5.75	
"	57@60 "	4.25@ 5.00	

SOFT HEMATITES, DRIED AT 212.

Bessemer	62@65 per cent.	$5.25@$6.00.
"	59@61 "	5.00@ 5.25.
Non-Bessemer	57@62 "	4.25@ 5.00.

Above prices are delivered on docks at Lake Erie ports.

Chicago. March 19.

(From our Special Correspondent.)

Pig Iron.—Trade in this direction during the past week has been of smaller volume, caused by the uncertainties of a declining market. We quote to-day for cash per ton of 2,240 pounds: Lake Superior charcoal No. 1 and 2, Lake Superior for car wheels, No. 3, and Lake Superior for malleable, No. 4 and 5, $22.50@$23.

No. 1 Lake Superior coke, Bay View, $19; No. 2 do., $18, and No. 3 do., $17.50.

No. 1 Scotch, according to brand, $26@$27. No. 1 American Scotch, Ohio black brands, $22@$22.50. No. 1 American Scotch (Milwaukee), $19.50. No. 1 silvery, $20@$21. Cold blast charcoal for car wheels, $26@$30. Old car wheels, $20.50. Old rails, $23.50@$24. Bar iron, common, $1.85 per 100 pounds. Rail splicers, bars, $1.90 per 100 pounds.

Plates, Tubes, etc.—In small lots we quote as follows: Tank iron, 2·75@2·80c.; tank steel, 3@3·10c.; shell iron and steel, 3·25c.; flange steel, 3·50c.; fire-box, 4·25@5·50c.; boiler rivets, 4@4·25c.; Norway rivets, 40 per cent.; boiler tubes, 1¾ inches and less, 45 per cent.; 2 to 4 inches, 50 per cent.; 4 inches and over, 52½ per cent.; No. 10 to 14 iron sheets, 2·90c.; No. 16, 3c.; No. 18, 2·25c.; No. 10 to 14 steel sheets, 3@3·25c.; No. 16, 3·50@3·75c.; No. 18, 3·75@4c.

In larger lots bar iron Meckler, 1·80c.; old rails, 1·70c.; sheet iron No. 27, 3·10c.. tank iron, 10 to 14, 2·30c.; tank steel, 10 to 14, 2·50c. Nails at $2·15 rate.

A great deal of stuff is offering at present. Prices are low and buyers are afraid to take hold.

Louisville. March 18.

(Special report by HALL BROS. & Co.)

There has been a lively skirmish for business during the past week, but notwithstanding the fact that liberal concessions have been made, no trades of any magnitude have been developed. Speculative lots figured prominently at the reduced figures; it was also developed beyond a doubt that furnace iron was offered in the same way. Buyers, as a rule, are well supplied for some time to come, and are disposed to act conservative and buy only in small quantities.

Hot Blast Foundry Iron.

Southern Coke	No. 1	$17.50@$17.75.
"	" No. 2	17.00@ 17.50.
"	" No. 3	16.00@ 16.50.
Mahoning Valley, Lake ore mixture		19.00@ 19.50.
Southern Charcoal	No. 1	18.00@ 18.50.
"	" No. 2	17.50@ 18.00.
Missouri	" No. 1	19.00@ 19.50.
"	" No. 2	18.75@ 19.00

Forge Irons.

Neutral Coke	16.00@ 16.50.
Cold Short	16.00@ 16.50.
Mottled	14.50@ 15.00.

Car Wheel and Malleable Irons.

Southern (standard brands)	23.00@ 23.50.
" (other brands)	19.50@ 20.50.
Lake Superior	23.00@ 23.50.

Philadelphia. March 20.

(From our Special Correspondent.)

Pig Iron.—Pig iron companies have been disappointed at the action of large buyers, who a week or two ago indicated an intention to make heavy purchases before the middle of the month. Very few large transactions have taken place; the only orders of any magnitude have been for special brands, and three or four standard brands, for old customers. Makers say that an urgent demand must soon set in, as stocks in consumers' hands are low. Small lots of Southern iron have been offered, and Northern buyers have made inquiries for large lots; but as yet very little business has been done. The effect, however, of the offers of Southern iron, and the holding-back policy of buyers here, has been to crowd prices down a little lower for ordinary makes. It is claimed that best makes will not bring as much money as a week or two ago, but this statement cannot be substantiated. Quotations for gray forge range from $16.75 to $17.25; No. 2 foundry, $18, with here and there a brand held at $18.25 or $18.50. No. 1 has sold this week at $19, but a good brand readily brings $19.50; $20 is rather an exceptional price. Buyers claim that pig iron is bound to go down, but a careful investigation of the market fails to show that they are correct. Makers state that surprises are in store for the trade. The explanation of this mysterious statement is, that several large consumers have about decided to place orders, and it is expected that they will do so within the next ten days. Bessemer is extremely dull and quoted at $20.50 at furnace.

Foreign Material.—Spiegeleisen is quoted at $35 for immediate delivery. Ferro-manganese ranges from $85@$95.

Billets and Slabs.—It is difficult to give actual selling prices, as so little business is being done. The market is in a demoralized condition.

Blooms.—Charcoal blooms range from $52@$55, according to quality; anthracite sold yesterday at $44. Scrap blooms have been offered on the market at $35.50.

Muck Bars.—Makers of muck bars are predicting a very heavy demand during April, this hope being based upon a number of inquiries received and the known fact that several large buyers will run out about that time. Buyers are refusing to pay present prices, expecting to be able to cover at $30. As low as $29 has been offered, while several parties are holding good iron at $31.

Skelp Iron.—The market is quiet. Quotations 1·90 for grooved, and 2·05 for sheared.

Nails.—The nail market is in a rather unsatisfactory condition; a number of small buyers are in the market. Quotations range fom $2@$2.10 for large lots. Makers are endeavoring to harden prices, in view of the expanding demand now near at hand.

Wrought Iron Pipe.—Prices are very firm for all kinds of pipes and tubes, and business is good Some propositions have been made for summer business at shaded prices; but the offers have not been accepted.

Merchant Iron.—Merchant iron is rather dull at 1·80@1·95, according to location of mill, size of order and quality of iron. The bar iron situation is rather discouraging. A heavy consumption is in progress, but for some reason or other, buyers are purchasing in a very small, annoying way. Manufacturers, however, speak quite hopefully of the future.

Sheet Iron.—An excellent demand continues, and card rates are firmly maintained for all kinds.

Plate Iron.—Four or five good sized orders for bridge plate, shell and flange were placed this week, and this fact has helped the market. There is a great deal of business to be placed, but buyers continue to hold back.

Structural Iron.—Very few large orders have been placed, but everything is in excellent shape. Quotations for bridge plates, 2·20; angles, 2·25; tees, 2·70; beams and channels, 3·10.

Steel Rails.—Business this week amounts to about 20,000 tons, at prices ranging from $34 to $35. Mill owners think there will be a gradual improvement in business from this on.

Old Rails.—Very few old rails are moving. Quotations are nominally $26 to $27, delivered at various points in the interior.

Scrap.—The scrap men are now gathering up a good deal of material, but find customers very backward. Buyers claim that scrap of all kinds must decline a little, and the best offer made for No. 1 this week was $24. Old car wheels are nominally $18.

Pittsburg. March 20.

(From our Special Correspondent.)

Raw Iron.—The past week was far from a satisfactory one. Dealers are evidently further apart than at date of last report. Makers and buyers are certainly very undecided as to the best course to pursue, more so than they have been for months. One of the difficulties to contend with is the probable consumptive requirements for the second three months of the year, from April to July. Most buyers have been purchasing as little as possible, while others have held off altogether, waiting to see if sellers would come down to their offers. While some dealers have lowered their prices for certain grades, there are others who refuse to listen to lower figures. This is particularly the situation in regard to Pittsburg furnaces, who have set their prices, from which they will not deviate although their figures for Bessemer and gray forge are considerably above what some parties claim to have purchased iron. Sellers contend that margins have been narrowed down to such an extent, that fractional charges in prices for the raw material often changes the account from profit to loss or vice versa. Another reason for the indisposition to enter into new engagements is the continued large production of pig iron, while consumption is said to be gradually decreasing, without any certainty as to what its proportion will be when business is again under full headway. A good deal of careful figuring has been gone into by buyers, with a view of making out a strong case; but, in point of fact, they do not have the courage of their convictions, because a good deal of material is being contracted for future consumption, as a protection against the possibility of advancing prices. Railroad requirements are still an unknown factor. Certain mills report business good, orders plenty, with rumors that large blocks have been placed for future delivery. There is one thing that seems to have been forgotten, the iron now being sold was made with cheap coke, with ore that cost one dollar per ton less than prices that will govern this year, to say nothing about the advance in labor. Last June Carnegie & Co. purchased 2,000 tons of Alabama pig, from samples furnished. As one of the firm remarked: "We intend to give the iron a fair trial; if it comes up to expectations other purchasers will follow." The iron came, was tried, and failed to reach expectations. The order was canceled; no more will be received by that firm. The fact is, when it comes to iron and steel, only the best kind will be found available here.

Coal and Coke Smelted Lake Ore.

1,500 Tons Gray Forge City Furnace	18.00 cash.
1,500 Tons No. 1 Bessemer City Furnace	21.50 cash.
1,000 Tons Bessemer	20.80 cash.
750 Tons Gray Forge	16.75 cash.
500 Tons Gray Forge	17.25 cash.
500 Tons Gray Forge	16.80 cash.
500 Tons Bessemer	20.00 cash.
500 Tons Bessemer off Grade	17.50 cash.
500 Tons Gray Forge City Furnace	18.00 cash.
300 Tons Bessemer off Grade	18.75 cash.
300 Tons Gray Forge All Ore	18.25 cash.

Coke, Native Ore.

100 Tons No. 2 Foundry	18.00 cash.
50 Tons Silvery	18.00 cash.
50 Tons Silvery	18.50 cash.
50 Tons Silvery Extra	20.00 cash.

Charcoal.

100 Tons Cold Blast	29.25 cash.
100 Tons No. 2 Foundry	22.75 cash.
55 Tons Cold Blast	29.25 cash.
50 Tons White Iron	21.50 cash.

Muck Bar.

1,000 Tons Neutral Muck, April	28.50 cash.
500 Tons Neutral	28.50 cash.
300 Tons Neutral	28.50 cash.

Steel Slabs and Billets.

500 Tons Billets	33.00 cash.
500 Tons Billets	32.00 cash.
200 Tons Billets	32.35 cash.
100 Tons Billets	32.35 cash.

Steel Wire Rods.

500 Tons American Fives	47.50 cash.

Bloom Ends.

550 Tons Bloom Ends	24.50 cash.
300 Tons Bloom Ends	23.00 cash.

New Steel Rails.

1,250 Tons New Rails	33.75 cash.

Ferro-Manganese.

50 Tons 80 per cent., Pittsburg	97.00 cash.
25 Tons 80 per cent., Pittsburg	97.00 cash.

Spiegel.

150 Tons 20 per cent spot	36.00 cash.

Old Iron and Steel Rails.

500 Tons American Ts	25.75 cash.
350 Tons Old Steel Rails	23.00 cash.
100 Tons American Ts	25.50 cash.

Prices.

Coke or Bituminous Pig—		20% Spiegel at Pittsburg	$35.00@36.00
Foundry No. 1	$18.50@19.00	Muck-Bar	28.50@28.75
Foundry No. 2	18.25@	Steel Blooms	32.50@33.00
Gray F. No. 3	17.50@17.75	Steel Slabs	31.50@32.50
" No. 4	16.75@17.00	Steel Cr'p Ends	24.50@
White	16.50@	Steel Bl. Ends	23.50@24.50
Mottled	16.50@	Ferro-Man., 80%, seaboard	90.00@
Silvery	18.25@20.00	Steel Billets	31.50@32.50
Bessemer	20.50@21.00	Old Iron Rails	25.75@26.00
Low Phos	27.00@	Old Steel Rails	22.50@23.00
Charcoal Pig—		No. 1 W. Scrap	22.50@33.00
Foundry No. 1	23.50@24.50	No. 2 W. Scrap	@18.00
Foundry No. 2	22.00@22.75	Steel Rails	33.50@34.00
Cold-Blast	25.00@29.00	" light sec	35.00@38.00
Warm-Blast	24.00@25.00	Bar Iron, nom	1.90@ 1.95
10 + 12% Spiegel at seaboard	32.00@32.50	Iron Nails	2.25@
		Steel Nails	2.25@
		Wire Nails	@ 2.80

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, March 21.

Heavy Chemicals.—Extreme excitement has prevailed in this market during the week. It is next to impossible to give a detailed account of its condition; and in a few words it is best described as being unsettled.

Owing to the labor troubles on the other side, we are reliably informed that with one or two exceptions all chemical works have suspended operations. There have been no shipments whatever of heavy chemicals, and there are no prospects of any to arrive for some time to come.

Even if the strike is ended and all difficulties amicably settled, it will be impossible to get any heavy chemicals here for two or three weeks. We may say that all prices have advanced, and that every description is very scarce.

Caustic Soda.—There is none here of the 60 per cent. variety, but we quote nominally: 3⅜@3½c.; 70 per cent. is 3¼@3¾c. 74 to 76 per cent., 3¾c., although there is none but the Greenbank brand here which is still higher in price. These works, by the way, have been shut down. Caustic soda ash is 2½@2¾c. Bleaching powder on the spot is 2¼@2¾c., according to brand, and for shipment 2⅛@2¼c. Sal soda for shipment is 1⅛@1·92c. Carbonated soda ash 48 per cent. is 2¾@3c. For the 58 per cent. variety 3@3½c. is asked.

Acids.—There seems to be an increased demand for acids, and dealers report an improvement in business in this market.

One manufacturer says that sulphuric acid has been sold at 90 cents in Connecticut, delivered there, and that even sales at 85 cents been rumored. The combination were the sellers. One member of the combination offered 50 per cent. nitric acid for 4.70 delivered at Communipaw, f. o. c.

Fertilizing Chemicals.—With the approach of the spring season the trade in fertilizers is improving all the time. Prices remain practically unchanged.

Dried blood still continues firm at $1.95@$2 for high grade, and $1.80@$1.85 for low grade. Other ruling prices are as follows: Azotine, $1.95@$2; dried blood, low grade, $1.85@$1.90; high grade, $2. Tankage, high grade, 9 to 10 per cent. ammonia and 15 to 20 per cent. phosphate, $20@$21 per ton, and low grade, 7 to 8 per cent. ammonia and 25 to 30 per cent. phosphate, $18.50. Fish scrap, $21.50@$22 per ton, f.o.b. factory. Sulphate of ammonia at $3.12½@$3.15 per cwt. Concentrated tankage, $1.90@$2.00. Refuse bone-black, guaranteed 70 per cent. phosphate, $20 per ton. Dissolved bone-black is nominally 95c. per unit for available phosphoric acid, although on lots of 500 tons or over this price might be somewhat reduced, and acid phosphate 80c. per unit for available phosphoric acid. Steamed bones, unground, $20@$23; ground, $25@$26.

Charleston rock, undried, $5.75 per ton; kilndried, $6.75@$7 per ton, both f. o. b. vessels at the mines. Freights by sail from Charleston to New York, $3@$3.25 per ton. Charleston rock, ground $11.50@$12, ex-vessel at New York.

Double manure salts 48 to 51 per cent. sulphate of potash, $1.12½ per 100 pounds for shipments from date; high grade manure salts, basis 90 per cent. sulphate of potash, $2 37½ per 100 pounds. For lots on the spot, an advance over the abovenamed figures of 2½c. per 100 pounds is quoted.

With the opening of German river navigation we may expect a reduction in the last mentioned articles.

Brimstone.—There is a firm market in this article and prices show an upward tendency. For best unmixed seconds we quote 18·75, and for best thirds 18·25@18.50.

Kainit.—This continues unchanged. The price is 11c. on the spot and river navigation on the other side is said to have opened this week, so we may expect greater activity in this article.

Non-muriate potash.—Sales in a jobbing way only are reported. There have been no arrivals this week and prices remain $1.80.

Nitrate of Soda.—The market for nitrate is somewhat firmer, and quotations, $1.75@$1.80. We hear of the arrival of 17,000 bags per Fanny Tucker, but evidently not for auction. We are in receipt of statistics from Mr. F. B. Nichols, issued under date of the 12th inst., which we herewith publish.

	1890.	1889.	1888.
Stocks in store and afloat in Atlantic ports, March 1, bags.	90,484	75,898	62,781
Arrivals	47,628	nil	nil
	138,112	75,898	62,781
Previously reported, 144,196; total arrivals to date, 191,824; same time 1889, 74,870; same time 1888, 52,169.			
Stocks	97,189	68,003	56,553
To arrive, 442,000; visible supply, 539,189; same time 1889, 316,503; same time 1888, 341,053.			
Stocks with dealers in store and afloat here:			
Deliveries fortnight ending March 15	40,923	7,895	6,228
Previously reported	105,438	84,972	52,828
Total deliveries to March 15	146,361	92,867	59,056
Sales spot	1.75 @ 1.80	2.35 @ 2.38	2.10 @ 2.20

"Spot business small and without animation. The deliveries were mainly on old contracts. The market sags under the weight of excessive supply; and until a way is found to put the stuff on the ground, the value must be fixed by the relation of supply to known wants. In Europe, there is a consumption only limited by the price and weather. The European markets sagged just as ours did, under a largely increased supply, but good weather and low prices have brought about such an increase of consumption by the farmers, that producers have become firmer in their views, and the decline was not only checked but an advance demanded."

BUILDING MATERIAL MARKET.

NEW YORK, Friday Evening, March 21.

Bricks.—Dealers report dullness which they attribute to that universal scapegoat, the weather. Quotations are for the best Haverstraws, $7.25@$7.50 per thousand; Haverstraw seconds, $7@7.25; Jerseys, $5.75@$7.00, and pales, $3.50@$3.75

Lime.—This market continues pretty much as reported last week. The demand continues good, and although there have been a few arrivals, supplies are still inadequate to satisfy the wants. Owing to the high freights for Maine lumber and ice, vessels which strictly belong to the lime fleet are engaged in the better-paying transportation alluded to. The late snows have caused a scarcity of fuel for the kilns in the lime districts, and this in all probability has something to do with the slimness of the supply here. We continue to quote the Association prices:

Rockland common, $1 per barrel; Rockland finishing, $1.20; St. John common and finishing, 90c.@95c.; Glens Falls, common and finishing, 85c. @$1.11.

Cement.—Nothing new has developed in the imported article. Canal navigation will be opened shortly, and then, so far as the domestic cement is concerned, prices and business will assume a more definite shape. Just now there is not much doing in either foreign or domestic. Ruling prices are as follows: Rosendale, per barrel, 90c.@$1.10; Portland, American, per barrel, $2.15@$2.45; Portland, foreign, per barrel, $5.25@$6.40; Portland, foreign, special brands, $2.45@$2.75; Roman, per barrel, $2.65@$2.85; Keene's coarse, per barrel, $4.50@$5.50; Keene's fine, per barrel, $7@$8.25.

NOTES OF THE WEEK.

The New England granite manufacturers will pay their men by the hour after May 1st.

The Indianapolis Builders' Exchange has notified the Building Trades' Union that it will oppose the eight-hour movement.

Out of 10,413 members of the Brotherhood of Carpenters who have voted on the eight-hour proposition, 9,095 recorded themselves in favor of it and 24 against it.

The Carpenters' Union of Oakland, Cal., has notified employers that after May 1st they will work eight hours a day at the present rate of wages.

Rudolph L. Dans has been selected as supervising architect of the new Thirteenth Regiment armory. He is the architect whose design received the first prize of $1,000 in the competition. He has been authorized to prepare plans and specifications as soon as possible for the building.

It was announced Monday that the New England Free Stone Contractors' Union, which, it will be remembered, locked out all its employés recently, as mentioned in our last issue, has proclaimed free shops, and advertised throughout this country and Europe for men to do the work in hand. This action was not taken, it is understood, until after a report had been received from a committee which was deputized to confer with the contractors in New York.

The Granite Manufacturers' Association of Rhode Island has just been formed, with the object of mutual benefit and protection to its members. They will work in harmony with the Granite Manufacturers' Association of New England, lately organized in Boston. A resolution was passed that the sense of the meeting was that the present condition of trade did not warrant an increase of wages.

The granite cutters of Concord, N. H., ask that they be paid regularly once a month, and that they shall receive for nine hours' work the same pay that they have received for ten hours.

The schedule which was presented to the manufacturers about two weeks ago has been returned without any action whatever, and this is regarded as a point in favor of the workmen, who meet again for further action.

IMPORTS AND EXPORTS OF METALS AT NEW YORK JANUARY 1 TO MARCH 8.

IMPORTS.

Spelter.	Week. Tons.	Year. Tons.
Amer. Metal Co		74
Meyer, G. A. & E.		9
Muller, Schall & Co		69
Total		152
Corres. date, 1889		56
Pig Lead.	Lbs.	Lbs.
Hendricks Bros		50
Schultz & Co., A		98
Total		148
Corres. date, 1889		
Tin.	Tons.	Tons.
Abbot, Jere, & Co		25
Amer. Metal Co		325
Bidwell & French		120
Bruce & Cook		10
Crooks & Co., R		25
Davol & Son		15
Hendricks Bros		20
Lehmaier, S., & Co.		10
Naylor & Co		200
Nissen, Geo		10
Phelps, Dodge & Co		500
Thomson, A. A. & Co		10
Townsend, & Co., J. R		30
Trotter & Co, N		50
Total		1,295
Corres. date, 1889		1,370
Tin Plates.	Boxes.	Boxes.
Bruce & Cook		11,404
Byrne & Son		1,000
Central Stamp. Co		22,521
Coddington & Co		16,833
Cohn & Co		2,225
Con. Fruit Jar Co		120
Corbiere F. & Co		1,763
Cort & Co		28,436
Crooks & Co		5,470
Dickerson, V. D. & Co		38,879
Haberman, F.		66
Herring, Chas. E.		1,000
Iron Clad Mfg. Co		277
Lalance & G. M. Co		1,734
Lehmaier, Schw'z & Co		200
Merchant & Co		5,852
Mersick & Co		1,426
Morewood & Co		23,563
Newell Bros		257
Pratt Mfg. Co		28,360
Phelps, Dodge & Co		88,246
Shepard & Co		789
Taylor, N. & G		234
Thomson & Co., A. A		8,141
Warren, J. M		545
Wheeler & Co		3,680
Whittemore & Co		3,096
Wolff & Reesing		625
Total		291,473
Corres. date, 1889		440,081
Pig Iron.	Tons.	Tons.
Crocker Bros		200
Irvin, R. I. & Co		100
Stetsson & Co., G. W		200
Williamson, J. & Co		200
Total		700
Corres. date, 1889		5,675

Steel Blooms, Billets, and Slabs.	Tons.	Tons.
Dana & Co		502
Downing, R. F. & Co		5
Martin & Co		80
Milne, A., & Co		16
Pope, Jas. E., Jr.		61
Roebling's Sons, J. A		55
Wolff, & Co., R. H		60
Total		779
Corres. date, 1889		7,519
Bar Iron.	Tons.	Tons.
Abbott & Co., Jere		381
Bacon & Co		478
Crocker Bros		77
Downing & Co		145
E. J. Jacobus		1
Fuller, Dana & Fitz		11
Lilienberg, N		235
Milne & Co		234
Muller, Schall & Co		200
Page, Newell & Co		652
Wilson, J. G		2
Total		2,226
Corres. date, 1889		1,589
Scrap Iron.	Tons.	Tons.
Samper & Co., S.		186
Ward, J. E. & Co		15
Total		201
Corres. date, 1889		1,103

Steel and Iron Rods.	Tons.	Tons.
Abbott & Co		2,354
American S. Co		225
Bacon & Co		22
Carey & Moen		60
Downing & Co		44
Galpin, S. A		731
Greely & Co. C. S.		30
Hazard Mfg. Co		12
Jacobus, E. Y		2
Lundberg, G		110
Milne & Co		180
Muller, Schall & Co		270
Naylor & Co		1,404
Page, Newall & Co		354
Roebling's Sons, J. A		612
Schulze, P. R		1
Wood & Niebuhr		25
Wolf & Co., R. H		1,720
Total		7,424
Corres. date, 1889		11,409
Old Rails.	Tons.	Tons.
Frankfort. M		1,536
Hernsheim, E		350
Total		1,886
Corres. date, 1889		4,936
Spiegeleisen.	Tons.	Tons.
Blakely & McLellan		1,504
Crocker Bros		3,607
Dana & Co		3,096
Foley, F		50
Geisenheimer & Co		202
Hernshime, L		4,432
Naylor & Co		2,963
Perkins, C. L		1,400
Sachs & Richmond		2
Whittemore, H. & Co		23
Total		15,579
Corres. date, 1889		16,572
Iron Ore.	Tons.	Tons.
Baiz, Jacob		67
Earnshaw, A		1,737
Ennis, Andrew		438
Total		2,242
Corres. date, 1889		3,173

EXPORTS.

Copper.	Pounds.	Pounds.
Abbott & Co., Jere		787,443
Amer. Met. Co., Lt		648,110
Belmont, Aug. & Co		778,496
Burgass & Co		72,328
Heidelbach, Schelheimer & Co		672,608
Ward, J. E. & Co		100,000
Wil'ms & T'hune		112,004
Total		3,188,989
Corre. date, 1889		
Copper Matte.		
American Metal Co		1,197,445
Lewisohn Bros		592,162
Nichols, Geo. H		267,202
Paulsen, Wm		1,039,428
Wil'ms & T'hune		1,716,310
Total		4,812,547
Corres date 1889		

DIVIDEND-PAYING MINES.

	NAME AND LOCATION OF COMPANY.	CAPITAL STOCK.	SHARES. No.	SHARES. Par	ASSESSMENTS. Total levied.	ASSESSMENTS. Date and amount of last.	DIVIDENDS. Total paid.	DIVIDENDS. Date and amount of last.
1	Adams s. L.	Colo.	$1,500,000	150,000	$10	*		.15
2	Alice, s. c.	Mont	10,000,000	400,000	25	*	800,000	Dec. 1889 .06¼
3	Alma Cons., g.	Idah	300,000	30,000	10	*	60,000	Jan. 1889 .50
4	Amerlean & Nettie, c.	Colo.		300,000			150,000	Nov. 1889 10
5	Amy & Silversmith, s.	Mon.		341,419			247,530	Aug. 1887 12½
6	Atlantic, c	Mich	1,000,000	40,000	25	$280,000	Apl. 1875	$1.00
7	Argenta, s	Nev..	10,000,000	100,000	100	335,000	July 1889	.10
8	Aspen Mg. & S., s. L.	Colo.	2,000,000	100,000	20	*	380,000	Mar. 1890 .10
9	Aurora, L	Mich	2,000,000	100,000	20	*	155,000	Oct. 1887 1.87½
10	Badger, s	Ont.	250,000	50,000	5	*	37,500	Mar. 1890 .25
11	Bassick, g. s.	Colo.	10,000,000	100,000	100		400,000	Mar. 1884 1.00
12	Belle Isle, s.	Nev..	10,000,000	100,000	100	155,000	Apl. 1889	.10
13	Belcher, g. s.	Nev..	10,400,000	104,000	100	2,822,000	Feb 1889	.60
14	Bellevue Idaho, s. L.	Idah.	1,250,000	125,000	10	120,000	Dec. 1889	25
15	Bodie Con., g. s.	Cal	10,000,000	100 000	100	575,000	Nov 1889	.25
16	Boston & Mont, g.	Mon	2,500,000	250,000	10	*		
17	Boston & Mont., c.s.	Mon	2,500,000	100,000	25	*		
18	Breece, s.	Colo	5,000,000	200,000	25	*	2,000	Feb. 1880 .01
19	Brooklyn Lead, L. s.	Utah	500,000	50,000	10		127,000	July 1887 .05
20	Bulwer, g.	Cal.	1,000,000	100,000	10	130,000	Aug. 1889	.25
21	Bunker Hill & Sull.	Idah.	3,000,000	300,000	10	*	150,000	Oct. 1883 .06¾
22	Caledonia, g.	Dak.	10,000,000	100,000	100	505,000	May 1885	.15
23	Calliope, s	Colo.	1,000,000	¶	1		70,000	Feb. 1890 .01
24	Calumet & Hecla, c	Mich	2,500,000	100,000	25	1,200,000		
25	Carbonate Hill s. L.	Colo.	1,500,000	200,000	10	*	33,350,000	Feb. 1890 5.00
26	Carlisle, g.	N. M.	1,000,000	200,000	5		80,000	Apl. 1884 .05
27	Castle Creek, g.	Idah.	100,000	100,000	1	*	175,000	Dec. 1883 .12½
28	Catalpa, s. L.	Colo.	3,000,000	300,000	10	*	51,000	Oct. 1883 .03
29	Central, c.	Mich	500,000	20,000	25	100,000	Sept 1861	.06
30	Chrysolite, s. L.	Colo.	10,000,000	200,000	50	*	270,000	May. 1884 .10
31	Colorado Central, s. L.	Colo.	2,750,000	275,000	10	*	1,950,000	Feb. 1890 1.00
32	Confidence, g. L.	Nev..		24,960		$306,160	Mar. 1890	.75
33	Cons. Cal. & Va., g. s.	Nev.	21,000,000	210,000	100	108,000	Jan. 1885	.20
34	Contention, s.	Ariz.	12,500,000	250,000	50		1,650,000	Dec. 1884 .25
35	**Cop. Queen Cons, c.	Ariz.	1,400 000	140,000	10		3,358,800	Feb. 1889 .50
36	Crescent, s. L. g.	Utah	15,000,000	600,000	25		‡2,587,000	Dec. 1889 .50
37	Crown Point, g. s.	Nev..	10 000 000	100,000	100	2,850,000	Sept 1889	.50
38	Daly, s. L.	Utah	3,000,000	150,000	20	*	11,584 000	Jan. 1875 2.00
39	Deer Creek, s. g.	Idah.	1 000,000	200,000	5	*	1,425,000	Mar. 1890 .25
40	Deadwood Terra, g.	Dak..	5,000,000	200,000	25	*	20,000	Jun. .05
41	Derbec B. Grav., g. s.	Cal.	10,000,000	100,000	100	90,000	Dec. 1881	.10
42	Dunkin, s. L.	Colo.	5,000,000	200 000	25	*	11,000,000	Nov. 1887 .10
43	Dunstone, g. s. L.	Mont	1,,000,000	200,000	5	*	210,000	Oct. 1889 .10
44	Eclipse	Colo.	100,000	100,000	1		390,000	Sept 1889 .05
45	Elkonrn, g. s.	Mont	1,000,000	100,000	10	50,000	July 1883	.50
46	Empire L., g.	Nev..	500,000	100,000	5	*	6,000	Nov. 1888 .03
47	Eureka Con., g. s. L.	Nev..	5,000,000	50,000	100	550,000	Jun. 1889	.50
48	Evening Star, s. L.	Colo.	500,000	50,000	10	*	20,000	Nov. 1887 .10
49	Excelsior, g.	Cal..	10,000,000	100,000	100	560,000	Sept 1885	1.00
50	Father de Smet, g.	Dak..	10,000,000	100 000	100	200,000	Nov 1878	1.00
51	Franklin, c.	Mich	1,000,000	40,000	25	220,000	Jun. 1871	
52	Freeland, g. s. c.	Colo.	5,000,000	200,000	25	*	930,000	Jan. 1889 2.00
53	Garfield Lt., g. s.	Nev.	500,000	100,000	5	*	190,000	July 1886 .10
54	Gould & Curry, g. s.	Nev..	10,800,000	108,000	100	4,434,000	Oct. 1889	.30
55	Grand Prize, s.	Nev..	10,000,000	100,000	100	715,000	Nov. 1889	.30
56	Granite, s. L.	Idah.	500,000	500,000	1	*	85,000	Apl. 1888 .12½
57	Granite Mountain, s.	Mont	10,000,000	400,000	25		1,837,972	July 1886 .06
58	Green Mountain, g.	Cal..	1,250,000	125,000	10	*	75,000	Apl. 1886 .25
59	Hale & Norcross, g. s.	Nev.	11,200,000	112,000	100	5,086,000	July 1887	.50
60	Hecla Con., g. L. c.	Mont	1,500,000	30,000	150	*	27,000	Feb. 1883 .10
61	Hel'a Mg & Red, g. s. L.	Mont	3,315,000	663,000	5	*	4,518,750	Mar. 1890 .10
62	Holmes, s.	Nev.	10,000,000	100,000	100	325,000	Mar. 1889	.25
63	Holyoke, g.	Utah	200,000	200,000	1		125,000	Sept 1887 .05
64	Homestake, g.	Dak..	12,500,000	125,000	100	200,000	July 1878	1.00
65	Honorine, s. L.	Utah	500,000	250,000	2	37,500	Apl. 1889	.05
66	Hope, s.	Mont	1,000,000	100,000	10	*	233,250	Apl. 1889 .20
67	Horn-silver, s. L.	Utah	10,000,000	400,000	25	*	4,100,000	Mar. 1890 .12½
68	Hubert, g.	Colo.	1,000,000	1 mil'n	1	*	247,000	Dec. 1889 .00½
69	Idaho, g.	Cal..	310,000	3,100	100		5,235,900	Dec. 1889 5.00
70	Ideal, s. L.	Colo.	1,500,000	50,000	10		15,000	Oct. 1886 .05
71	Illinois, s.	N. M.	100,000	100,000	1		45,000	Apl. 1889 .20
72	Independence, s.	Nev..	10,000,000	100,000	100	340,000	Oct. 1886	.20
73	Iron Hill, g.	Dak..	2,500,000	250,000	10	134,000	July 1889	.05
74	Iron-Silver, s. L.	Colo.	10,000,000	500,000	20	*	2,500,000	Apl. 1889 .20
75	Jackson, g. s.	Nev.	5,000,000	50,000	100	237,500	Nov 1880	.20
76	Jay Gould	Mont	2,000,000	40,000	5	*	55,000	Jun. 1889 .10
77	Jocusitita, s	Mex.	2,500,000	250,000	10		395,000	Apl. 1889 .04
78	Jumbo, g.	Colo.	2,000,000	200,000	10		1,200,000	Feb. 1889 .50
79	Kearsarge, c.	Mich	1,250,000	50,000	25	190,000	Oct. 1887	1.00
80	Kentuck, s.	Nev.	3,000,000	30,000	100	369,000	Dec. 1889	.30
81	La Plata, s. L.	Colo.	2,000,000	200,000	10	*	1,350,000	Dec. 1886 .10
82	Leadville Cons., s. L. L.	Colo.	4,000,000	400,000	10	*	610,000	Sept 1882 .30
83	Lexington, g. s.	Mont	4,000,000	40,000	100	*	423,000	Apl. 1889 .05
84	Little Chief, s. L.	Colo.	10,000,000	200,000	50	*	609,000	Jan. 1885 2.00
85	Little Pittsburg, s. L.	Colo.	20,000,000	200,000	100	*	810,000	Jan. 1890 .05
86	Martin White, s.	Nev.	10,000,000	100,000	100	100,000	Feb. 1890	.25
87	Mary Murphy, g. s.	Colo.	350,000	3,500	100	*	1,050,000	Mch 1886 .25
88	Matchless, s.	Colo.	500.000	500,000	1	*	140,000	Dec. 1886 .25
89	Minnesota, g.	Mich	1,000,000	40,000	25	420,000	Apl. 1886	1 00
90	Mono, g.	Cal.	5,000,000	50,000	100	102,850	Nov. 1889	.25
91	Montana, Lt., g. s.	Mont	3,300,000	660,000	5	*	175,000	May 1888 .10
92	Mornlng Star, s. L.	Mont	1,000,000	216,000	10		2,415,951	Jan. 1890 .09
93	Moulton, s. G.	Mont	2,000,000	400,000	5	*	9,550,000	Dec. 1889 .20
94	Mount Pleasant, g.	Cal..	150,000	150,000	1	*	380,000	Dec. 1887 .07½
95	Mt. Diablo, s.	Nev.	5,000,000	50,000	100	137,500	Jun. 1880	2.00
96	Napa, Q	Cal..	700,000	100,000	7	*	150,000	Feb. 1887 .30
97	Navajo, g. s.	Nev..	10,000,000	100,000	100	485,000	Apl. 1888	.30
98	New Guston, s.	Colo.	500,000	100,000	5	*	163,000	Oct. 1889 .20
99	N. Hoover Hill, g. s.	Colo.	300,000	120,000	2½	*	365,000	Apl. 1889 .10
100	Northern Belle, s.	Nev..	5,000,000	50,000	100	425,000	Jan. 1884	8.00
101	North Belle Isle, s.	Nev..	10,000,000	100,000	100	400,000	Sept 1889	.20
102	North Star, g.	Cal..	1,000,000	100,000	10		287,500	Dec. 1889 .50
103	Ontario, s. L.	Utah	15,000,000	150,000	100		230,000	May 1888 .50
104	Ophir, g. s.	Nev..	10,000,000	100,000	100	4,159,440	May 1889	.50
105	Original, s. C.	Mont	1,500,000	60,000	25	*	10,850,000	Mar. 1890 .50
106	Osceola, C.	Mich	1,250,000	50,000	25	480,000	Apl. 1876	1.60
107	Oxford, g.	N. S.	1	125,000			1,945,800	July 1882 1.00
108	Paradise Valley, g. s.	Nev.	10,000,000	100,000	100	57,000	Apl. 1888	.15
109	Parrot, c.	Mont	1,800,000	180,000	10		123,000	July 1884 .05
110	Peacock, s. g. c.	N.M.	2,000,000	200,000	10	*	1,272,500	Mar. 1890 1.00
111	Plumas Eureka, g.	Cal..	1,406,250	140,625	10	*	75,500	Sept 1888 .02
112	Plutus, g. s. C.	Colo.	2,000,000	200,000	10	*	150,000	Apl. 1887 .10
113	Plymouth Con., g.	Cal..	5,000,000	100,000	50		516,000	Jan. 1890 .10
114	Quicksilver, pref., g.	Cal..	4,300,000	43,000	100		60,000	Nov. 1886
115	" com., g.	Cal..	5,700,000	57,000	100		2,280,000	Feb. 1883 .40
116	Quincy' c.	Mich	1,000,000	40,000	25	200,000	Dec. 1862	
117	Republic, c.	Mich.	5,000,000	100,000	50	400,000	Dec. 1889	.30
118	Richmond, s. L.	Nev..	1,350,000	54,000	25	*	1,577,053	Feb. 1890 1.50
119	Ridge, c.	Mich.	500,000	20,000	25	219,939	Mar 1886	.50
120	Robinson Con., s. L.	Colo.	10,000,000	200,000	50	*	643,867	July 1882 .40
121	Robert E. Lee, s. L.	Colo	10,000,000	500,000	20		5,370,000	Jan. 1890 3.00
122	Savage, s.	Nev..	11,200,000	112,000	100	6,542,000	July 1889	.50
123	Shoshone, g.	Idah.	150,000	150,000	1		4,312,587	Jun. 1887 1.25
124	Sierra Buttes, g.	Cal..	2,225 000	122,500	10		99,785	Feb. 1888 .50
125	Sierra Nevada, g. L.	Nev..	10,000,000	100,000	100	6,250,000	Oct. 1889	.50
126	Sierra Nevada, s. L.	Idaho	1,000,000		1		585,000	Mar. 1886 .50
127	Silver Cord, g. s. L.	Colo.	4,500,000	450,000	10		40,000	May 1889 .02
128	Silver King, s.	Ariz.	10,000,000	100,000	100	50,000	Jan. 1890	.30
129	Silver Mg. of L. V.	N. M.	500,000	500,000	1		270,000	July 1887 .25
130	Silverton, g. s. L.	Colo.	2,000,000	200,000	10	*	50,000	June 1889 .05
131	Small Hopes, s.	Colo.	5,000,000	250,000	20	*	75,000	Feb. 1890 .05
132	Spring Valley, g.	Cal..	200,000	200,000	1	50,000	Oct. 1886	.25
133	Standard, g. s.	Cal..	10,000,000	100,000	100	50,000	Feb. 1890	.25
134	Stormont, s	Utah	500,000	500,000	1	*	50,000	Jan. 1889 .50
135	St. Joseph, L	Mo..	1,500,000	150,000	10	*	3,137,500	Jun. 1889 .10
136	Swansea, c.	Colo.	600,000	60,000	10	*	3,585,350	Jun. 1888 .05
137	Tamarack, c.	Mich.	1,000,000	40,000	25	520,000	Apl. 1885	3.00
138	Tip Top, s.	Ariz.	10,000,000	100,000	100	250,000	Sept 1883	.25
139	Tombstone, g. s. L.	Ariz.	12,500,000	500,000	25	*	155,000	Nov. 1881 .05
140	United Verde, c.	Ariz.	3,000,000	300,000	10	*	844.000	Dec. 1887 .20
141	Valencia, M.	N. H.	150,000	1,500	100	*	9,000	Apl. 1888 .02½
142	Viola Lt., s. L.	Idah.	750,000	150,000	5	*	100,000	Nov. 1881 .20
143	Ward Cons., s. L.	Colo.	2,000,000	200,000	10		20,000	Dec. 1889 .05
144	Yankee Girl	Colo.	2,500,000	250,000	10		2,184,000	Aug. 1873 1.50
145	Yellow Jacket, s. g.	Nev..	12,000,000	120,000	100	5,500,000	Mar 1889	.50
147	Webb City, L. Z.	Mo.	55,000	11,000	5		3,300	Jun. 1889 .10
148	Woodside	Utah					25,000	Oct. 1889 .10
149	Young America	Cal..					175,000	1889 .25
								1889 .10

NON-DIVIDEND PAYING MINES

	NAME AND LOCATION OF COMPANY.	CAPITAL STOCK.	SHARES. No.	SHARES. Par Value.	ASSESSMENTS. Total levied.	ASSESSMENTS. Date & am't of last.
1	Agassiz Cons., s. L.	Colo.	$2,500,000	50,000	$50	*
2	Alleghany, s.	Colo.	5,000,000	500,000	10	
3	Alloues, c.	Mich	2,000,000	80,000	25	$737,000 Jan. 1890 .50
4	Alpha Con., g. s.	Nev..	3,000,000	30,000	100	558,750 July 1888 $7½
5	Alta, s.	Nev..	10,080,000	100,800	100	2,248,800 Sept 1888 .50
6	Amador, g.	Cal..	400,000	200,000	2	*
7	American Flag, s.	Colo.	1,250,000	125,000	10	300,000 Jun 1877 .10
8	Amity, s.	Colo.	250,000	250,000	1	
9	Anglo-Montana, Lt.	Mon.	600,000	120,000	5	
10	Astoria, g.	Cal..	200,000	100,000	2	
11	Barcelona, g.	Nev..	5,000,000	200,000	25	
12	Bechtel Con., g.	Cal..	10,000,000	100,000	100	173,500 Jan. 1883 .10
13	Belmont, s.	Nev..	5,000,000	50,000	100	735.000 Apl. 1886 .10
14	Best & Belcher, g. s.	Nev..	10,080,000	100,800	100	2,180,590 Jan. 1890 .25
15	Big Pittsburg, s. L.	Colo.	20,000,000	200,000	100	*
16	Bi-Metallic, s.	Mon.	5,000,000	200,000	25	*
17	Black Oak, g.	Cal..	3,000,000	300,000	10	*
18	Boston Con., g.	Cal..	10,000,000	100,000	100	170,000 Nov 1883 .25
19	Bremen, s.	N. M.	5,000,000	500,000	10	*
20	Brewlow, s.	Colo.	250,000	250,000	1	*
21	Brunswick, g.	Cal..	2,000 000	400,000	5	*
22	Bullion, g. s.	Nev.	10,000,000	100,000	100	4,007,000 Aug. 1888 .50
23	Calaveras, g.	Cal..	500,000	500,000	1	*
24	Carisa, g	Wy.	500,000	100,000	5	*
25	Carupano, g. s. L. c.	Ven.	200,000	100,000	2	*
26	Cashier, g. s.	Colo.	500,000	250,000	2	*
27	Charles Dickens, g. s.	Idah.	1,250,000	250,000	5	*
28	Cherokee, g.	Cal..	1,500,000	150,000	10	
29	Chollar, s.	Nev..	11,200,000	112,000	100	1,484,000 July 1889 .50
30	Cleveland, T.	Dak.	1,000,000	500,000	2	*
31	Colchis	N. M.	500,000	50,000	10	
32	Commonwealth, s.	Nev.	10,000,000	100,000	100	170,000 Nov. 1882 .50
33	Comstock, g. s.	Nev..	10,000,000	100,000	100	30 000 Mar. 1887 .15
34	Con. Imperial, g. s.	Nev..	5,000,000	50,000	100	1,802,500 Nov. 1889 .05
35	Con. Pacific, g.	Cal..	6,000 000	60,000	100	192,000 Oct. 1889 .10
36	Cons. Silver, s.	Mo..	2,500,000	250,000	10	
37	Crescent, s. L.	Colo.	3,000,000	300,000	10	
38	Crocker, s.	Ariz.	10,000,000	100,000	100	135,000 Jan. 1890 .10
39	Crowell, g.	N. C.	500,000	500,000	1	*
40	Dahlonega, g.	Ga.	250,000	250,000	1	*
41	Dandy, s.	Colo.	5,000,000	500,000	10	*
42	Decatur, s.	Colo.	1,500,000	300,000	5	*
43	Denver City, s. L.	Colo.	5,000,000	500,000	10	*
44	Denver Gold, g.	Colo.	300,000	60,000	5	*
45	Durango, g.	Colo.	500,000	500,000	1	*
46	Eastern E. and Co., Lt.	N. S.	1,500,000	150,000	10	990,000 Mar. 1886 1.00
47	El Cristo, g. s.	U.S.C	1,000,000	500,000	2	*
48	El Dorado, g.	Cal.	1,000,000	250,000	4	*
49	El Talento, g.	U.S.C	1,000,000	500,000	2	*
50	Empire, s.	Utah	10,000,000	100,000	100	*
51	Eureka Tunnel, s. L.	Nev..	10,000,000	100,000	100	*
52	Exchequer	Nev.	10,000,000	100,000	100	615,000 Apl. 1889 .25
53	Found Treasure, g. s.	Nev..	10,000,000	100,000	100	30,530 Apl. 1889 12½
54	Gogebic L. Syn.,	Wis.	5,000,000	200,000	25	*
55	Gold Cup, s.	Colo.	500,000	500,000	1	*
56	Golden Era, s.	Mon.	2 000,000	200,000	10	*
57	Gold Placer, g.	Colo.	5,000,000	200,000	25	229,314 Dec. 1886 .25
58	Gold Rock, g.	Cal.	1,000,000	500,000	2	*
59	Goodshaw, g.	Cal.	10,000,000	100,000	100	*
60	Grand Belt, c.	Tex.	12,000,000	120,000	100	
61	Grand Duke	Colo.	800,000	80,000	10	*
62	Great Remance, g.	U.S.C	1,000,000	500,000	2	*
63	Gregory-Bobtail, g.	Colo.	550,000	550,000	1	*
64	Gregory Con., g.	Mon.	3,000,000	300,000	10	*
65	Harlem M. M. Co, g.	Ga.	1,000,000	200,000	5	*
66	Head Cent. & Tr. s.	Ariz.	10,000,000	100,000	100	*
67	Hector, g.	Cal..	1,500,000	300,000	5	45,000 Jan. 1889 .15
68	Highland, c.	Mich	500,000	25,000	20	
69	Hollywood	Cal..	200,000	100,000	2	
70	Hortense, s.	Colo.	2,000,000	200,000	10	
71	Huron, c	Mich	1,000,000	40,000	25	280,000 May 1887 3.00
72	Inman M. & Silver, s.	N. M.	2,000,000	200,000	10	*
73	Ironton, L.	Wis.	1,000,000	40,000	25	
74	Iroquois, c	Mich	1,250,000	50,000	25	
75	J. D. Reymert	Ariz.	10,000,000	100,000	100	
76	Julia Cons., g. s.	Nev..	11,000,000	110,000	100	1,660,000 Jan. 1889 .10
77	Lacrosse, g.	Colo.	1,000,000	100,000	10	
78	Lee Basin, s. L.	Colo.	5,000,000	500,000	10	*
79	Mayflower Grave l.	Cal..	1,000,000	100,000	10	585,000 Mar. 1890 .50
80	May Mazeppa, s.	Colo.	500,000	500,000	1	
81	Medora, g.	Dak.	250,000	250,000	1	
82	Mexican, g. s	Nev..	10,000,000	100,000	100	2,800,760 Dec. 1889 .25
83	Middle Bar	Cal..	400,000	200,000	2	*
84	Mike & Starr, s. L.	Colo.	1,000,000	200,000	5	*
85	Mollie Gibson	Colo.	2,000,000	100,000	2	*
86	Monitor, g.	Colo.	100,000	1,000,000	1	*
87	Mutual Mg. & Sm.	W'sh	100,000	1,100,000	1	*
88	Native, c.	Mich	1,000,000	40,000	25	
89	Neath, g.	Colo.	1,000,000	100,000	10	
90	Nevada Queen, s.	Nev	10,000,000	100,000	100	250,000 Oct. 1889 .25
91	New Dermody, g.	N. S.	100,000	100,000	1	*
92	New Pittsburg, s. L.	Colo.	2,000,000	200,000	10	*
93	N. Commonw'h, s.	Nev.	10,000,000	100,000	100	60,000 Apl. 1889
94	North Standard, g.	Cal..	10,000,000	100,000	100	20,000 Nov
95	Noonday	Cal..	600,000	60,000	10	208,000 Dec. 1881 .10
96	Oneida Chief, g.	Cal..	500,000	125,000	100	*
97	Oriental & Miller, s.	Nev..	10,000,000	400,000	25	
98	Osceola, g.	Nev.	5,000,000	500,000	10	
99	Overman, g. s.	Nev.	11,520,000	115,200	100	3,823,460 Dec. 1889
100	Park, s.	Utah	2,000,000	200,000	10	
101	Peer, s.	Ariz.	10,000,000	100,000	100	155,000 Sept 1889 .10
102	Peerless, s.	Ariz.	10,000,000	100,000	100	370,000 Mar. 1889 .25
103	Phœnix	Ariz.	500,000	500,000	1	*
104	Phœnix, g. s.	Ariz.	5,000,000	250,000	25	*
105	Phœnix Lead, s. L.	Colo.	100,000	100,000	1	*
106	Pilgrim, g.	Cal..	600,000	300,000	2	*
107	Potosi, s.	Nev..	11,200,000	112,000	100	1,461,600 Sept 1889 .50
108	Proustite, s.	Idah	250,000	250,000	1	*
109	Puritan s. G.	Colo.	1,500,000	150,000	10	*
110	Quincy	Colo.	3,000,000	300,000	10	*
111	Sapphaire, g. s.	Ariz.	250,000	250,000	1	*
112	Red Elephant, s.	Colo.	500,000	500,000	1	*
113	Ropes, g. s.	Mich	2,000,000	80,000	25	147,200 July 1887 .50
114	Russell, g	N. C.	1,500,000	300,000	5	
115	Sampson, g. s. L.	Utah	10,000,000	100,000	100	288,157 July 1888 1.00
116	San Sebastian, g.	San.S	1,600,000	320,000	5	*
117	Santa Fe, c.	N. M.	5,000,000	500,000	10	*
118	Santiago, g.	U.S.C	400,000	200,000	2	*
119	Security, s.	Colo.	10,000,000	1,000,000	10	*
120	Sheridan	N.M.	2,000,000	200,000	10	*
121	Silver Queen, c.	Ariz.	5,000,000	200,000	25	*
122	South Bulwer, g.	Cal..	10,000,000	100,000	100	100,000 May 1881 .25
123	South Hite	Cal..	10,000,000	100,000	100	195,000 Jan. 1883 .05
124	South Pacific	Cal..	2,000,000	200,000	5	*
125	Stanislaus, g.	Cal..	2,000,000	200,000	10	*
126	St. Kevin, g. s.	Colo.	100,000	100,000	1	*
127	St. Louis & Mex., s.	Mex.	5,000,000	500,000	10	*
128	St. Louis & St. Elmo	Colo.	2,000,000	200,000	10	*
129	St. L. & St. Felipe, g. s.	Mex.	1,500,000	150,000	10	*
130	St. L. & Sonora, g. s.	Mex.	1,500,000	150,000	10	*
131	St. Louis Xavapel,	Ariz.	3,000,000	300,000	10	*
132	Sunday Lake, i.	Mich	1,250,000	50,000	25	*
133	Sullivan Cons.	Dak.	600,000	200,000	3	*
134	Sutter Creek, g.	Cal..	500,000	100,000	5	*
135	Sutro Tunnel	Nev..	20,000,000	2,000,000	10	*
136	Sylvanite, s.	Colo.	5,000,000	500,000	10	*
137	Taylor-Plumas, g.	Cal..	1,000,000	200,000	5	10,000 Feb. 1888 .25
138	Tioga Cons., g.	Cal..	10,000,000	100,000	10	295,000 May 1888
139	Tornado Cons. g. s.	Nev..	100 000	100,000	1	*
140	Tortilita, g. s.	Ariz.	1,000,000	100,000	110	*
141	Tuscarora, s.	Nev..	10,000,000	500,000	20	160,000 Oct. 1889 .25
142	Union Con, g. s.	Nev..	10,000,000	100,000	100	3,285,000 Feb 1890 .25
143	Utah, s.	Nev..	10,000,000	100,000	100	195,000 Mar. 1890
144	Whale, s.	Colo.	500,000	500,000	1	*
145	Washington, c.	Mich	1,000,000	40,000	25	*
146	West Granite Mt., s.	Mon.	5,000,000	500,000	10	*
147	Yuma, c. s. g.	Ariz.	10,000,000	400,000	25	*
148	Zelaya, g. s.	C. A.	600,000	300,000	2	*

G. Gold. S. Silver. L. Lead. C. Copper. * Non-assessable. † This company, as the Western, up to Dec. 10th, 1881, paid $1,400,000. ‡ Non-assessable for three years. § The Deadwood reviously paid $275,000 in eleven dividends, and the Terra $75,000. Previous to the consolidation in Aug., 1884, the California had paid $31,320,000 in dividends, and the Con. Virginia, 240 00,000. ** Previous to the consolidation of the Copper Queen with the Atlanta, Aug., 1885, the Copper Queen had paid $1,350,00 in dividends. ¶ 1,000,000.

NEW YORK MINING STOCKS QUOTATIONS.

DIVIDEND-PAYING MINES

NAME AND LOCATION OF COMPANY.	March 15.		March 17.		March 18.		March 19		March 20.		March 21.		SALES.
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Adams, Colo.	....	.....	....	....	....	...	....	....	1.00	....	....	..	1,000
Alice, Mont.	....	.....	....	....	....	...	....	....	....	....	....	....	.....
Argenta, Nev.	...	...	.15	..	....	....	....	....	....	....	....	....	200
Aspen Mg. Colo	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Belcher	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Belle Isle, Nev.	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Bodie Cons., Cal.	.50	. .	....	....	....	....	....	....	....	....	....	....	100
Bos. & Mont., Mont.	....	.....	....	....	....	....	....	....	....	....	....	....	..
Breece, Colo	....	.....	....	....	....	....	....	....	....	....	....	....	....
Bulwer, Cal.	....	.....	....	....	. .	.....	....	....	....	....	....	....	.....
Caledonia, Dak	....	.....	....	....	....	....	2 00	....	....	....	....	....	300
Calumet & Hecla	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Colorado Central	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Cons. Cal. & Va., Nev.	4.10	.....	4 15	4 10	4 30	...	....	....	....	....	....	....	330
Crown Point, Nev	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Deadwood, Dak	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Dunkin, Colo.	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Eureka Con.	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Father de Smet, Dak	.38	.....	....	....	....	.....	35	....	....	....	....	....	400
Franklin, Mich	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Freeland, Colo.	1 20	1.15	1 10	1.05	1 05	..	1.10	1.05	1.10	1 00	1.35	1 05	17,500
Gould & Curry, Nev.	1.45	..	.	....	1 40	....	....	....	....	....	....	..	500
Hale & Norcross, Nev	....	.....	....	....	2.40	....	....	....	....	....	....	....	100
Holyoke, Id.	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Homestake, Dak.	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Horn-Silver, Ut.	2.50	.....	2.50	2 45	2.50	....	2.45	....	2.55	2 45	....	....	1,620
Iron Hill, Dak.	...	.....	....	....	....	....	.50	....	....	....	....	....	200
Kentuck, Nev.	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Leadville C., Colo.	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Little Chief, Colo.	....	.....	....	....	.30	....	....	....	....	....	....	....	100
Little Pittsburg, Colo	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Moulton, Mont.	....	.....	.33	....	....	....	....	....	....	.33	....	..	2,200
Mt. Diablo, Nev.	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Navajo, Nev.	...	.....	.28	.. ..	....	....	....	....	.30	....	....	....	200
North Belle Isle, Nev.	...	....	1 10	.. ..	....	....	....	....	....	....	....	....	100
North Star, Cal.	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Ontario, Ut.	....	.....	....	....	....	....	41.00	....	....	....	41.00	....	175
Ophir, Nev.	3.90	....	....	....	....	....	....	....	....	....	....	....	100
Osceola, Mich	....	.....	....	....	....	.....	....	.....	....	....	....	....	.....
Plutus, Colo.	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Plymouth, Cal.	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Quicksilver, Pref	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Com.	....	.....	....	....	6.25	6.13	....	....	....	....	....	....	400
Robinson Cons. Colo.	....	.....	....	....	....	....	.40	....	.42	.40	6 38	....	700
Savage, Nev.	....	.....	....	....	1.45	....	....	....	....	....	....	....	100
Sierra Nevada, Nev.	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Silver Cord.	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Silver King	....	.....	....	....	....	....	....	....	.45	....	.36	..	200
Silver Mg. of L. V.	....	.....	....	....	....	....	....	....	.42	.40	....	....	1,000
Small Hopes, Colo.	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Standard, Cal	....	.....	.20	.15	....	....	.15	....	....	....	....	....	1,000
Tamarack	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Ward Cons., Colo	....	.....	.35	....	....	....	....	....	....	....	....	....	100

NON-DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	March 15.		March 17.		March 18.		March 19		March 20.		March 21.		SALES
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Allouez, Mich	....	....	....	.....	....	....	....	....	....	.....	....	....	.....
Alta, Nev.	....	.....	....	....	1.25	....	....	....	....	....	....	....	200
Andes, Nev.	....	.....	....	.....	....	....	....	....	....	....	....	....	.....
Amador, Cal.	....	.....	....	.....	....	....	....	....	....	....	....	....	.....
American Flag, Colo	....	.....	....	.....	....	....	....	....	....	....	....	....	.....
Astoria, Cal.	.07	.06	.06	..	.06	....	.06	....	.06	....	.06	....	17,500
Barcelona, Nev.	....	.....	....	....	....	....	....	....	.22	....	.21	....	500
Bechtel, Cal	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Best & Belcher, Nev	2.60	...	....	....	2 65	....	....	....	....	....	....	....	200
Brunswick, Cal.	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Bullion, Nev.	.65	.....	.70	....	....	....	.65	....	....	....	.65	...	750
Butte & Bost, Mont.	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Castle Creek, Id.	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Choilar, Nev	2.25	.....	....	....	2.15	....	....	....	....	....	....	....	200
Col. & Beaver, Id.	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Commonw'th, Nev.	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Comst'ck T., Nev.	....	.....	....	....	....	....	....	....	....	....	....	....	.....
" bonds.	....	.....	....	....	....	....	....	....	30 00	....	....	....	1,000
" scrip	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Con. Imperial, Nev.	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Del Monte, Nev.	....	.....	....	....	....	....	....	....	....	....	....	....	.....
El Cristo, Rep of Col.	1.45	....	1 45	....	1.35	1 30	1.65	1.25	1.55	1.50	1.55	....	4,100
Excelsior, Cal.	....	.....	....	....	....	....	....	....	....	....	.80	....	100
Exchequer Nev.	.70	.....	....	....	....	....	....	....	....	....	....	....	100
Julia, Nev.	.30	.....	.30	....	....	....	....	....	....	....	.30	....	700
Kingst'n & Pemb'ke	....	.....	....	....	.60	.55	....	....	.60	....	....	....	2,900
Kossuth, Nev.	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Lacrosse, Colo.	.07	....	.07	....	.07	....	.07	....	.07	....	.07	....	10,500
Lee Basin, Colo.	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Mexican, Nev.	3.10	....	....	....	3.00	....	....	....	....	....	....	....	200
Middle Bar, Cal.	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Moulton, Mont	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Mutual Sm. & M. Co	....	....	1.70	....	1.65	....	1.60	....	1 70	....	1.65	....	900
Nevada Queen, Nev.	....	.....	....	....	....	....	....	....	....	....	....	....	.....
N. Com'nw'th, Nev.	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Occidental, Nev.	....	.....	....	....	....	....	....	....	.85	....	....	....	200
Oriental & Mil., Nev	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Overman, Nev.	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Phœnix of Ariz.	.90	.82	.90	.85	.90	.85	.90	.82	.83	....	.87	.81	14,600
Potosi, Nev.	1.95	.....	....	....	....	....	....	....	....	....	....	....	100
Rappahann'k, Va	....	.....	....	....	....	....	....	....	.06	.05	.06	.05	2,500
S. Sebastian, San S	....	.....	....	....	....	....	....	....	....	....	.30	....	200
Scorpion, Nev.	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Shoshone Idaho	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Silver Hill, Nev.	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Silver Queen	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Stanislaus, Cal.	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Sutro Tunnel, Nev.	....	.....	....	....	....	....	....	....	....	....	.06	....	400
" Trust Cert.	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Sutter Creek, Cal.	1.80	1 75	1.85	1.80	2.00	1 90	2.25	2.05	2.50	2.25	2.40	2.35	11,800
Tornado, Nev.	....	.....	....	....	....	....	....	....	....	....	....	....	.....
Union Cons., Nev.	.55	....	....	....	....	....	....	....	....	....	....	....	300
Utah, Nev.	....	....	.60	....	.55	....	....	....	....	....	.65	....	700

Ex. dividend. †Dealt in at the New York Stock Ex. Unlisted securities. ‡Assessment unpaid. Dividend shares sold, 28,625. Non-dividend shares sold, 77,750 Total, New York, 106,375.

BOSTON MINING STOCK QUOTATIONS.

NAME OF COMPANY.	Mch. 14.		Mch. 15.		Mch. 17.		Mch. 18.		Mch. 19.		Mch 20.		SALES.
Atlantic, Mich.	14 00	13.88	. .	.....	....	....	.....	. .	13.00	....	13.00	....	280
Bodie, Cal.	....	.....	....	.....	....	....	.....	....	....	....	....	....	.....
Bonanza Developm't.	.90	.....	....	.....	.88	....	.....	....	....	....	....	....	200
Bost. & Mont., Mont.	50.75	49.63	50.25	49.50	50.00	49 00	49.00	48.13	48 25	48 00	48 63	48 25	4,565
Breece, Colo.	.40	....	....	....	.41	....	.43	....	....	....	....	....	800
Calumet & Hecla, Mich.	260	....	260	....	....	....	258	....	256	....	....	....	25
Catalpa, Colo.	.28	....	....	....	....	....	....	....	....	....	....	....	500
Central, Mich.	....	.....	....	.....	....	....	....	....	....	....	....	....	.....
Chrysolite, Colo	....	.....	....	.....	....	....	....	....	....	....	....	....	.....
Con. Cal. & Va., Nev.	....	.....	....	.....	....	....	....	....	....	....	....	....	450
Dunkin, Colo.	....	.....	.60	.....	61	....	60	....	.63	.61	....	....	1,260
Enterprise	....	.....	....	.....	....	....	....	....	....	....	....	....	.....
Franklin, Mich.	15.50	15.00	....	.....	15.25	15 00	15.50	....	15.00	....	16.00	15.50	460
Freeland, Col.	....	.....	....	.....	....	....	....	....	....	....	....	....	.....
Monomine, Utah.	....	.....	....	.....	....	....	....	....	....	....	....	....	.....
Little Chief.	....	.....	....	.....	....	....	....	....	....	....	....	....	.....
Little Pittsburg, Colo.	....	.....	....	.....	....	....	....	....	....	....	....	....	.....
Martin White, Nev.	....	....	....	.....	....	....	....	....	....	....	....	....	.....
Moulton.	....	.....	....	.....	....	....	....	....	....	....	....	....	.....
Napa, Cal.	....	.....	....	.....	....	....	....	....	....	....	....	....	.....
Ontario, Utah	....	.....	....	.....	....	....	....	....	....	....	....	....	.....
Osceola, Mich.	30.50	30.00	30.25	30.00	29.50	29.13	29.50	28.63	28.75	28.50	28.75	....	3,117
Pewabic, Mich.	....	.....	....	.....	....	....	....	....	....	....	....	....	.....
Quincy, Mich.	72.00	.....	72 00	....	....	....	....	....	....	....	....	....	99
Ridge, Mich.	....	.....	....	.....	....	....	....	....	....	....	....	....	.....
Sierra Nev., Nev.	....	.....	....	.....	....	....	....	....	....	....	....	....	.....
Silver King, Ariz.	....	.....	....	.....	....	....	....	....	....	....	....	....	.....
Standard, Cal	....	.....	....	.....	....	....	....	....	....	....	....	....	.....
Tamarack, Mich.	159	....	....	.....	160	156	160	159½	158	....	....	....	58

NAME OF COMPANY.	Mch. 14.		Mch. 15.		Mch. 17.		Mch. 18		Mch. 19.		Mch. 20.		SALES
Allouez, Mich.	3 38	3 25	3.25	3 13	3.25	3.00	3 13	.....	3.13	3.10	3.00	.....	1,350
Arnold, Mich.	.40	.35	.40	....	.....	... ..	.40	35	....	....	.40	.....	1,450
Aztec, Mich.	....	....	....	....	....	....	.09	....	....	....	....	....	100
Bowman	....	.....	....	.....	....	....	....	....	....	....	....	....	.....
Butte & Bost., Mont.	15.75	15.50	15.75	15.50	15.50	....	15.25	14 00	14.88	14 50	14.38	14 00	2,720
Centennial, Mich.	24.13	24 00	24.10	...	24.38	23 50	24.00	23.13	23.00	22.00	21.00	.....	1,479
Coms. Tunnel Scrip	....	.....	....	.....	....	....	....	....	....	....	....	....	.....
Crescent, Colo.	.10	...	....	.....	.10	.....	.10	...	....	....	....	....	450
Dana	....	.....	....	.....	....	....	....	....	....	....	....	....	.....
Don Enrique, N. M.	.38	....	....	.....	.38	...	.38	...	.39	....	....	....	400
El Cristo, S. A.	....	.....	....	.....	....	....	....	....	....	....	....	....	.....
Hanover, Mich.	....	.....	....	.....	....	....	....	....	....	....	....	....	.....
Humboldt, Mich.	....	.....	....	.....	....	....	....	....	....	....	....	....	.....
Hungarian	.15	.....	....	....	....	....	....	....	....	....	....	....	100
Huron, Mich.	3 50	.....	....	....	3.50	....	3.50	....	....	....	....	....	400
Kearsarge	10 38	10.25	10.50	10.25	10.50	10.38	12.25	10.50	11 50	10.50	11.00	10.75	5,585
Mesnard, Mich.	.38	.....	....	.....	....	....	....	....	.35	....	....	....	200
National, Mich.	1.50	.....	....	.....	1.75	....	....	....	....	....	....	....	200
Native, Mich	....	.....	....	.....	....	....	....	....	.97	....	....	....	200
Phœnix, Ariz.	....	.....	....	.....	.91	....	.90	....	....	....	....	....	300
Pontiac, Mich.	....	.....	....	.....	....	....	....	....	.25	....	....	....	100
Rappahannock, Va.	....	.....	....	.....	....	....	....	....	....	....	....	....	.....
Rockland	....	.....	....	.....	....	....	....	....	....	....	....	....	.....
Santa Fe, N. Mex.	1.08	1 05	....	...	1.08	1.03	1 10	1.03	1.03	1.00	....	.....	8,860
Security, Colo.	....	.....	....	.....	....	....	....	....	....	....	....	....	.....
Shoshone, Idaho	....	.....	....	.....	....	....	....	....	....	....	....	....	.....
South Side, Mich.	....	.....	....	.....	....	....	....	....	.17	....	....	....	100
Star	....	.....	....	.....	....	....	....	....	....	....	....	....	.....
Washington, Mich	....	.....	....	.....	....	....	....	....	....	....	....	....	.....

Boston: Dividend shares sold, 11,304. Non-dividend shares sold, 23,994. Total Boston, 35,298.

COAL STOCKS.

NAME OF COMPANY.	Par val. of sh'rs.	March 15.		March 17.		March 18.		March 19.		March 20.		March 21.		Sales.
		H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
American Coal.	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Cambria Iron.	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Cameron Coal & Iron Co	....	3¼	3	3¼	....	....	....	....	....	3	....	....	....	1,300
Ches. & O. RR.	100	....	....	....	....	....	....	....	....	....	....	....	....	.....
Chic. & Ind. Coal RR.	100	....	....	....	....	....	....	....	....	....	....	....	....	.....
Do. pref.	100	....	....	....	....	....	....	....	....	....	....	....	....	.....
Col. & Hocking Coal	100	....	....	....	....	....	....	....	....	....	....	....	....	.....
Col., C. & I	100	45⅝	45⅝	45¾	44⅞	45	44⅝	45	44	44½	43¾	45¾	44	9,053
Consolidation Coal.	100	....	....	....	....	....	....	....	....	....	....	....	....	.....
Del. & H. C.	100	....	....	....	....	148¾	148¼	148¾	148¼	149	.....	143⅜	149	1,121
D., L. & W. RR.	50	136½	135⅞	136½	135¾	135¾	135½	135⅛	134½	135⅝	134⅞	136⅜	135¼	49,055
Hocking Valley	100	20⅞	20⅝	22	21⅛	....	....	....	....	....	....	22	21¾	1,800
Hunt. & Broad Top	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Do. pref.	....	....	....	43¼	....	....	....	....	....	43	....	....	....	108
Illinois Coal & Coke Co.	....	31½	31	31	30½	....	.....	30¾	30⅝	30⅝	30½	30⅞	30¾	1,555
Lehigh C. & N.	50	....	....	....	....	51⅞	....	....	....	....	....	....	....	437
Lehigh Valley RR.	50	51⅞	51⅝	52	51¾	51⅞	51¾	51⅞	51¾	.....	.....	....	....	1,361
Marshall Con. Coal.	100	....	....	....	....	....	....	....	....	....	....	....	....	.....
Mahoning Coal.	100	....	....	....	....	....	....	....	....	....	....	....	....	.....
Do. pref.	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Maryland Coal	100	....	....	....	....	....	....	....	....	....	....	....	....	.....
Morris & Essex.	100	....	....	149	.....	149⅞	.....	150	149½	....	....	....	....	274
New Central Coal.	50	....	....	....	....	....	....	....	....	....	....	....	....	.....
N. J. C. R.R.	100	....	....	....	....	....	....	119	.....	120½	120¼	121¼	120½	1,500
N. Y. & S. Coal	100	....	....	....	....	....	....	....	....	....	....	....	....	.....
N. Y., Susq. & Western	100	7	....	....	....	6¾	.....	....	....	....	....	....	....	550
Do. pref.	100	....	....	....	....	....	....	28	....	....	....	....	....	250
N. Y. & Perry C. & I.	100	....	....	....	....	....	....	....	....	....	....	....	....	.....
Norfolk & Western R.R.	50	....	....	....	....	....	....	19¼	.....	....	....	....	....	200
Do. pref.	50	60⅛	.....	60⅛	60	....	....	60⅜	60⅛	....	....	60⅛	.....	1,500
Penn. Coal	50	....	....	....	....	....	....	....	....	....	....	....	....	.....
Penn. RR.	50	54¼	54⅛	54¼	54⅛	54⅛	53⅞	54	53⅝	....	....	....	....	3,761
*Ph. & R. RR.	....	40⅝	39⅝	41	40¾	40⅝	40¼	40⅛	39¾	40	39¾	40⅝	39⅞	155,538
Sunday Creek Coal.	....	....	....	....	....	....	....	....	....	....	....	....	....	.....
Do. pref.	100	....	....	....	....	....	....	....	....	....	....	....	....	.....
Tennessee C. & I. Co.	.....	48¾	47½	47½	44	48	44	51½	45	54½	51	...	.....	59,533
Do. pref.	....	....	....	....	....	103	96	99	97	105	.....	....	....	680
Westmoreland Coal.	....	....	....	....	....	....	....	....	....	....	....	....	....	.....

**Sales in New York, 111,730; in Philadelphia, 43,808. Total sales, 269,076.

San Francisco Mining Stock Quotations.

COMPANY	CLOSING QUOTATIONS. March 14	March 15.	March 17.	March 18.	March 19.	March 20.
Alpha	.....	.....	.....	.....	.....	.....
Alta	.....	.....	.... ..	.....	.....	1.10
Belcher	....	.....	.....	.....	.....	.....
Belle Isle	.....	.....	.20	.....	.....	.20
Best & Bel.	2.55	.....	2.55	2.50	2.50	.....
Bodie	....	....	....	.45	.50	.45
Bulwer	.15	.....	1.15	.....	.....	.....
Choilar	2.15	2.05	2.10	2.00	2.20	2.10
C'm'weal'h	2.55	2.60	2 85	2.70	2.80	2.60
Con. C. & V	4.30	4.15	4.20	.....	4.35	4.30
Con. Pac.	.....	.....	.....	.....	.....	.....
Crown Pt.	1.65	1 60	.....	1.55	1.60	.....
Eureka C.	.....	.....	.....	.....	.....	.....
Gould & C.	1.35	.....	.....	1.25	1.35	1.30
Grd. Prize.	.....	.....	.....	.....	.....	.....
Hale & N.	2.40	.....	2.35	2.25	2 40	2.30
M. White.	.....	.....	.....	.....	.....	.....
Mexican.	3.00	3.00	.....	2.95	3.05	2 90
Mono.	.....	.....	.....	.....	.....	.....
Mt. Diablo	.....	.....	2.00	2.50	.....	.....
Navajo	.....	.....	.....	.....	.25	.....
Nev. Queen	.....	.....	.70	.75	.....	.....
N. Belle I.	.....	.....	1.00	.....	.....	.....
Occidental.	.....	.....	.....	.....	.....	.....
Ophir.	3.90	3 85	3.70	3.70	3.90	3.75
Potosi.	1 90	1.90	1.85	1.90	2.10	2.05
Savage	1.55	1 50	1.50	1.45	1.55	1.55
Sierra Nev	2.05	2.05	2.00	2.05	2.10	2.00
Union Con.	2.15	2.10	2.05	2.10	2.15	1.90
Utah	.45	.45	.45	.45	.....	.45
Yellow Jkt.	.....	1.90	1.90	1.90	1 95	1 90

STOCK MARKET QUOTATIONS.

Baltimore, Md.

COMPANY.	Bid. L. H.	Asked. L. H.
Atlantic Coal	....	1.50
Balt. & N. C.	.09	.11
Big Vein Coal	....	....
Conrad Hill	....	.10
Cons. Coal	.23	.25
Diamond Tunnel	....	.40
George's Crk. C	....	.112
Lake Chrome	....	.15
Maryland & Charlotte	....	....
North Star	.10	.20
Silver Valley	.60	75@.80

Prices bid and asked, lowest and highest, during the week ending March 19th.

Birmingham, Ala.

COMPANY.	Bid L. H.	Asked. L. H.
Ala. R. Mill Co.	$100	$60
*Alice Furnace	$104½	....
Anna Howe G. Mg. Co.	$¾	$1
Bessmer Land	$33¼@$34	$35⅝
Bir. Mg.& Mfg.	$85	....
Cahaba Coal Mg. Co	$55	$65
Camille Gold Mg. Co	$⅛	$1⅛
De Bardeleben C. & I. Co.	$78¾@$79½	$81@$82
Decat. L. Imp.	$10¾	....
DecaturMin.L.	$21	$23
Ensley Land	$10	....
*Eureka	$120	....
Florence L. & Mg. Co.	$19	$23
Gadsen Land	$6	$6¼@$6⅜
Hecla Coal Co.	$30	....
Hen. S. & M.Co	$101@$102	$95
Mag-Ellen	$100	....
Mary Lee C. & R. Co.	$30	....
Sheffield C. & I. Co.	$69	$73
Sloss I. & S.	$40	$59
†Sloss I. & S.	$95¼	....
††Sloss I. & S.	$76	$79
Tuscaloose C. I. & L. Co	$21	....
Tenn.C. & I. Co.	$44	$48
" pref.	$99	$102

Woodstock I.Co.$56¼@$56¾ $56¾@$58

Prices, highest and lowest, bid and asked during week ending March 17th.

* Bonds. † First mortgage. †† Second mortgage.

Kansas City, Mo. March 17.

COMPANY.	Par value.	Bid.	Asked.
Ben Harrison		$25.00	$35.00
Burch, L. & Z., Mo.	1	.20	.30
Express Group		.75	1 00
Hillsboro Gold		....	....
Farmers' Coal Co		50.00	75.00
Ida Hill, S., N. Mex	100	....	100
Kansas City L. & Z.		.60	....
Kan. City M. & M. Co.		2.60	3.00
K. C., Colo.		....	....
Kentuck, Z., Mo	1	....	....
La Motte, Mo	100	....	100.00
Leona		....	125
Maverick, S., Colo.	10	....	1.00
Minnequa Zinc		.25	.45
Quartz Mt.		.67	....
Ruby Silver		1.12	1.25
Sonora, G. & S., Mex.	10	....	1.00
Standard, S, S., Colo.		....	....
Silver Monument		....	3.00
Templar, N. Mex.	1	....	1.00
The Sylph		....	2.50
Webb City, L. Z., Mo.	5	5.65	....
Wichita, L. Z., Kan.	100	....	.40

Pittsburg, Pa.

COMPANY.	B.	A.	Closing
Allegheny Gas Co.	$41.00	....	$40.00
Bridgewater Gas Co.	31.50	33.00	30.00
Chartiers Val. Gas	45.50	50.00	47.25
Columbia Oil Co.	....	....	....
Consolidated Gas Co.	....	....	....
East End E. Light Co.	60.00	65.00	65.00
East End Gas Co	60.00	61.50	60.00
Forest Oil	....	....	....
Hazlewood Oil Co.	51.00	50.00	51.00
La Noria Mining	*25.00	*25.00	*25.00
Luster Mg. Co.	*17.75	*17.75	*17.75
Manuf'turers Gas Co.	20.00	21.50	20.00
Nat. Gas Co. of W.Va	70.00	72.00	70.00
N.Y.& Clev.Gas Coal	31.00	....	31.00
Ohio Valley Gas	....	....	....
Mansfield C. & C. Co.	20.00	....	20.00
Pennsylvania Gas	14.00	14.25	14.12
People's Natural Gas.	....	40.00	40.00
People's N. G. & P. Co.	*16.00	*16.90	*16.00
Philadelphia Co.	*32.88	*32.00	*32.80
Pine Run Gas Co.	77.00	78.00	77.50
Pittsburg Gas	66.00	68.00	67.00
Silverton Mg. Co.	1.25	1.50	1.25
South Side Gas.	....	....	....
Tuna Oil Co.	68.00	69.00	68.00
Union Gas	....	....	....
Washington Oil Co.	....	....	....
W'house Brake Co.	60.00	55.00	60.25
W'house A. B. Co.	113.00	115.00	114.00
W'house E.Light.	45.50	46.00	46.00
W'moreland & Camb.	20.00	....	20.00
Wheeling Gas	....	20.00	20.00
Yankee Girl Mg.	3.00	3.75	3.00

* Actual selling price.

Prices bid, asked and closing during the week ending March 20.

Sales during the week ending March 20, 1890:

Chartiers Gas	170 shs.	$47.50@$46.75
E. End E. L. Co.	20 "	@$60.00
La Noria Mg. Co.	100 "	@.25
Luster Mg. Co	10 "	@$17.75
People's N. G. & P.	30 "	@$16.00
Philadelphia Co.	233 "	$33¼@$32.00

St. Louis. March 19.

CLOSING PRICES.

COMPANY.	Bid.	Asked.
Adams, Colo.	$ .97½	$ 1.00
American & Nettie	1.95	1.97½
Anderson	....	....
Aztec, N. Mex.	.18¾	.20
Bi-Metallic	....	....
Black Oak, Cal.	.00½	.01
Black Spar	....	....
Bremen	.02½	....
Buckskin	.06	.06½
Carriboo, Idaho	....	....
Central Silver	.21¼	.23¾
Cleveland, Colo.	.03	....
Cleveland, Idaho	....	.40
Cœur d'Alene	....	....
Dinero, Colo.	....	.02
Golden Era, Mont.	.02½	.03
Golden King	.10½	.11½
Gold Run	.01	.02
Granite Mountain, Mont.	43.50	44.00
Hope, Mont.	2.00	3.00
Ingram	.56¼	.80
Iron Clad	....	....
Ivanhoe, Colo.	....	....
I. X. L., Colo.	.06	.07
Keystone	.03	.03½
La Union	.14½	.16¼
Little Giant	.02	.03
Major Budd, Mont.	.14¾	.18¾
Mexican Imp., Mex.	.30	.31¼
Michael Breen	.65	.70
Montrose Placer, Colo.	....	.50
Mountain Key	.60	.65
Mountain Lion	.06½	.08½
Neath, Colo.	.10	.15
Old Colony	....	....
Old Jesuit	....	....
Pat Murphy, Colo.	.07½	.08½
Pedro	.03	....
Phillips, Colo.	....	....
Pine Grove, Idaho	.05½	.06
Queen of the West, Idaho	....	....
Raspberry, Mont.	....	....
San Francisco, Mont.	.01½	.02½
Silver Age, Colo.	1.57½	1.62½
Silver Bell	.10	....
Small Hopes, Colo.	.90	1.05
Tourtelotte, Colo.	.05	.05½
West Granite, Mont.	.77½	....
Wire Patch	.16¼	....
Yuma, Ariz.	.60	.61¼

Trust Stocks. March 21.

The following closing quotations are reported to-day by C. I. Hudson & Co., members of New York Stock Exchange:

CERTIFICATES.

American Cotton Oil, old	$28 @$32
*American Cotton Oil, new	27½@ 27½
Cattle Trust	11 @ 15
Distillers' & Cattle Feeders'	36 @ 40
Linseed Oil	42½@ 43½
National Lead	18¼@ 18½
Natural Gas	@145
Standard Oil	164 @165
Sugar Refineries	69¾@ 69⅞

*These are the American Cotton Oil Central Trust Co.'s receipts and are known as new, and represent the old certificates which have been deposited in the Central Trust Co. in furtherance of the reorganization plan—from a trust to a corporation

Sales at the New York Stock Exchange week ending March 21:

	Sales.	Price H.	Price L.
*American Cotton Oil	3,340	27½	26⅝
National Lead	13,521	19¼	18
Sugar	113,122	70¼	66⅝

*Trust receipts.

Foreign Quotations.

London.

COMPANY.	Highest.	Lowest.
Almada, Mex.	1s 3d.	1s. 9d.
Amador, Cal	18s.	16 .
Appalachian, N. C.	1s.	6d.
Canadian Phos. Canada.	£⅜	£⅛
Carlisle, N. Mex	3s.	2s.
Colorado, Colo.	4s. 6d.	4s.
Comstock, Utah	....	....
Condova	....	....
Cons. Esmeralda, Nev.	3s.	2s. 6d.
Denver Gold, Colo.	1s. 3d.	9d.
Dickens Custer, Idaho.	2s. 6d.	2s.
East Arevalo, Idaho.	3s.	2s.
Eberhardt, Nev	....	....
El Callao, Venezuela	....	....
Elmore, Idaho	2s. 6d.	2s.
Empire, Mont	....	6d.
Garfield, Nev.	4s	3s.
Jay Hawk Mont	3s.	2s. 6d.
Josephine, Cal	4s.	2s.
Kohinoor, Colo.	2s.3d.	1s. 9d.
La Luz, Mex.	1s. 6d.	1s.
La Trinidad, Mex.	....	....
La Valera, Mexico	1⅛s.	1s.
Montana Lt., Mont	£1¼	£1⅛
New California, Colo.	8s. 6d.	7s. 6d.
New Consolidated	1s.	6d.
New Eberhardt, Nev.	1s.	6d.
New Emma, S., Utah	2s.	1s.
New Flagstaff, Utah	2s.	1s. 6d.
Newfoundland, N. F.	3s.	2s. 6d.
N. Gold Hill, N. C.	1s.	6d.
New Hoover Hill, N. C.	1s. 6d.	1s.
Old Lout, Colo.	£15-16	£13-16
Palmarejo, Mex	16s. 6d.	15s. 6d.
Pinos Altos, Mex	£2	£1
Pittsburg Cons., Nev.	2s.	1s.
Richmond Con., Nev.	1¾s.	1¼s.
Ruby&Dunderberg,Nev	1s. ½d.	6d.
Sam Christan, N. C.	2s. 3d.	1s. 9d.
Sierra Buttes, Cal.	5s.	4s.
" Plumas Eur.	£1¼	£⅞
Sonora, Mex.	1s.	6d.
Stanly, N. C	3s 6d.	2s. 6d.
United Mexican, Mex.	7s.	5s.
U. S. Placer, Colo.	3s.	2s. 6d.
Viola Lt., Idaho	2s. 3d.	1s. 9d.

Highest and lowest prices during the week ending March 8th.

Paris.

	Francs.	Francs.
Belmez, Spain	675.00	675.00
Callao, Venez.	75 00	75.00
Callao Bis, Venez	4.00	4.00
East Oregon, Ore.	10.50	10 50
Forest Hill Divide, Cal	180.00	180 00
Golden River, Cal	400.00	400.00
" " parts	65.00	65 00
Lexington, Mont.	135.00	135.00
" parts	4.25	4.25
Ouray, Colo.	10.00	10.00
Rio Tinto, Spain	375.00	375 00
Tharsis, Spain	115 00	115.00

Highest and lowest prices during the week ending March 4th.

CURRENT PRICES.

These quotations are for wholesale lots in New York.

CHEMICALS AND MINERALS.

Acid—Acetic, ₱ 100 lbs. $1.75@$2.00
Acid—Muriatic, 18°, ₱ 100 lbs. 1.00@1.50
Acid—Muriatic, 20°, ₱ 100 lbs. 1.12½@1 75
Acid—Muriatic, 22° ₱ 100 lbs. 1.37½@2.00
Acid—Nitric, 36°, ₱ 100 lbs. 4.00@4.25
Acid—Nitric, 42°, ₱ 100 lbs. 6.00@6.25
Acid—Oxalic, ₱ 100 lbs. .6.50@10.50
Acid—Sulphuric, 60°, ₱ 100 lbs. 80@1.25
Acid—Sulphuric, 66°, ₱ 100 lbs. 1.00@1.75
Alkali—Refined, 48 p. c. 1.50@1.55
Alkali—Refined, 58°. 1.40@1.45
Alum—Lump, ₱ lb. 1¾
Alum—Ground, ₱ lb. 1⅞@2
Alum—Lump. ₱ ton, Liverpool £4 17 6
Alum—Sulphate of Alumina, ₱ ton. £4 10
Aqua Ammonia—18°, ₱ lb. 4¾
Aqua Ammonia—20°, ₱ lb. 6
Aqua Ammonia—22°, ₱ lb. 6@7
Aqua Ammonia—26°, ₱ lb. 10@11
Ammonia—Sul., ₱ 100 lbs. 3.15
Ammonia—Carb., per lb. 7½@8½
Arsenic—White, powdered, ₱ lb. 3¼@3½
Arsenic—Red, ₱ lb. 5¾@6¾
Arsenic—White, at Plymouth, ₱ ton. £12 2 6d.
Asbestos—Am., p. ton. $50@$300
Asbestos—Italian, p. ton, c. i. f. L'pool. £18@£80
Asphaltum—P. ton 13.00
Asphaltum—Prime Cuban, ₱ lb. 4½@5½c
Asphaltum—Hard Cuban, ₱ ton. $28.00
Asphaltum—Trinidad, refined, ₱ ton. $30.00
Barytes—Sulph., Am. prime white 17@20
Barytes—Sulph.,foreign,floated, p. ton. 19½@21.50
Barytes—Sulph., off color, p. ton 11.50@14.00
Barytes—Carb., lump, f.o.b. L'pool, ton £6
Barytes—No. 1, casks, Runcorn " £4 10 0
Barytes—No 2, bags, Runcorn " " 3 15 0
Bleach—Over 35 p.c., ₱ lb. 1.70@1.75
Borax—Refined, ₱ lb. 9½@9⅝
Borax—Concentrated 7¾@8⅜
Borax—Refined at Liverpool, ₱ ton. £29
Brimstone—*See Sulphur.*
Bromine—₱ lb. 37@38
Chalk—₱ ton .75
Chalk—Precipitated, ₱ lb. 4¾@5
China Clay—English, ₱ ton 13.50@18.50
China Clay—Southern, ₱ ton 13.50
Chrome Yellow—₱ lb 10@25
Cobalt—Oxide, ₱ lb. 2.60@2.90
Copper—Sulph. English Wks, ton £20@£21
Copperas—Common, ₱ 100 lbs. 70
Copperas—Best, ₱ 100 lbs. .75@1.00
Copperas—Liverpool, ₱ ton, in casks £1 15s.
Cream of Tartar—Am. 99% 22½
Cream of Tartar—Powdered, 99 p. c. 23
Emery—Grain, ₱ lb 4½@5
Emery—Flour, ₱ lb 2¾@3½
Feldspar—Ground, ₱ ton. 15.00
Fuller's Earth—Lump, ₱ bbl. .90@95
Fuller's Earth—Powdered, ₱ lb. 1⅞@2
Gypsum—Calcined, ₱ bbl. 1.25@1.50
Iodine—Resublimed 2.75
Kainit—₱ ton 10.00
Kaolin—*See China Clay.*
Lead—Red, ₱ lb. 6¾@9
Lead—White, American, in oil, ₱ lb. 6¾@7¼
Lead—White, English, ₱ lb 8½@8¾
Lead—Acetate, or sugar of, white 12@13
Lime Acetate—Amer. Brown. .95@1.00
Lime Acetate—" Gray 1.75@1.87½
Litharge—Powdered, ₱ lb. 6½@6¾
Litharge—English flake, ₱ lb. .9@9½
Magnesite—Dredged, ₱ ton. 20.00
Manganese—Crude, per unit .23@.28
Manganese—Oxide, ground, per lb. 2½@6½
Mercuric-Chloride—(*Corrosive Sublimate*) ₱ lb. .70@72
Mineral Wool—₱ lb. 2
Mica—In sheets according to size, 1st quality, ₱ lb. .25@$6 00
Ochre—Yellow, "B. F.," ₱ ton, f.o.b. mill 30.00
Ochre—"J. F. L. S.," ₱ lb. ex dock 2½
Phosphate Rock—S. Carolina, per ton, f. o. b. Charleston. 5.75@7.00
Phosphate Rock—Ground, ex vessel New York. 11.00
Phosphate Rock—Canadian Apatite, lump, f. o. b. at Montreal, ₱ ton 16.00
Phosphorus—₱ lb. .70@75
Plumbago—Ceylon, ₱ lb. 4@7
Plumbago—American, ₱ lb. 5@7
Potassium—Cyanide, ₱ lb. .39@40
Potassium—Bromide, ₱ lb. 33
Potassium—Chlorate, ₱ lb. 13@10
Potassium—Carb. ₱ lb. 4.70@5.54
Potassium—Caustic, ₱ lb. 7¼@8
Potassium—Iodide 2.65@2.70
Potassium—Muriate, ₱ 100 lbs. 1.80
Potassium—Nitrate, refined, ₱ lb. 6@8
Potassium—Bichromate, ₱ lb 10½@11
Potassium—Sulphate, ₱ 100 lbs. 2.30@2 35
Potassium—Yellow Prussiate, ₱ lb. 17½@18
Potassium—Red Prussiate, ₱ lb. 42@45
Pumice Stone—Select lumps, lb. 3¼
Pumice Stone—Original cks., ₱ lb. 1¾@2
Pumice Stone—Powdered, pure, ₱ lb. 2¼@2½
Pyrites—Non-cupreous, p. units 10d
Quartz—Ground, ₱ ton. 14.00@16.00
Rotten Stone—Powdered, ₱ lb. 3¼@3½
Rotten Stone—Lump, ₱ lb 6@10
Salt—Liverpool, ground ₱ sack. 75@80
Salt—Turk's Island, ₱ bush. .25@82
Salt Cake—₱ lb. .60@62½
Saltpeter—Crude, ₱ lb. 5¼@5½
Saltpeter—Refined, ₱ lb 6@8
Soda Ash—Carb., 48 % ₱ 100 lb. 1.45
Soda Ash—Caustic, 48 % 1.30
Soda Caustic, 60% 2.50
Soda Caustic, 70% 2.27½@2.35
Soda Caustic, 74-6% 2.27½@2 35
Sal, English, ₱ 100 lbs. 1.00
Sal, American, ₱ 100 lbs .90
Nitrate. 100 lbs. 1.90@1.95
Strontium—Nitrate ₱ lb. 9@9½
Sulphur—Roll, ₱ lb. 1¾
Sulphur—Flour, ₱ lb 2
Sulphur—Crude Brimstone, 2s., ₱ ton. 19.50
Sulphur—Crude Brimstone, 3ds, ₱ ton. 19 00
Talc—Ground French, ₱ lb. 1¼@1½
Talc—Domestic, ₱ ton $18@$20
Talc—c. i. f. Liverpool, ₱ ton £4 5
Vermillion—American, ₱ lb. 61
Vermillion—English, ₱ lb. 82@85
Vitriol—(Blue), Ordinary, ₱ lb. 5½@5⅝
Vitriol—Extra, ₱ lb. 7
Zinc Oxide—Am., Dry, ₱ lb. 4½
Zinc Oxide—Antwerp, Red Seal, ₱ lb. 6@6½
Zinc Oxide—Paris, Red Seal, ₱ lb. 6¼@7
* Spot

THE RARER METALS.

Aluminum—(Metallic), ₱ lb.	$2.@$2.50
Aluminum—Sheet, per lb.	2.50
Arsenic—(Metallic), per lb.	.40
Barium—(Metallic), per gram	$4.00
Bismuth—(Metallic), per lb.	2.75
Cadmium—(Metallic), per lb.	1.00
Calcium—(Metallic), per gram	10.00
Cerium—(Metallic), per gram	7.50
Chromium—(Metallic), per gram	1.00
Cobalt—(Metallic), per lb.	6.00
Didymium—(Metallic), per gram	9.00
Erbium—(Metallic), per gram	7.50
Gallium—(Metallic), per gram	140.00
Glucinum—(Metallic) per gram.	12.00
Indium—(Metallic), per gram	9.00
Iridium—(Metallic), per oz.	7.00
Lanthanum—(Metallic), per gr.	10.00
Lithium—(Metallic), per gram	10.00
Magnesium—Per lb.	4.50
Manganese—Metallic, per lb.	1.10
Manganese—Chem. pure, per oz.	10.00
Molybdenum—(Metallic), per gm.	.50
Niobium—(Metallic), per gram	5.00
Osmium—(Metallic), per oz	65.00
Palladium—(Metallic), per oz.	35.00
Platinum—(Metallic), per oz.	9.00
Potassium—Metallic, per lb	28 00
Rhodium—(Metallic), per gram.	5.00
Ruthenium—(Metallic), per gm.	5.50
Rubidium—(Metallic), per gram	2.00
Selenium—(Metallic), per oz.	1.80
Sodium—(Metallic) per lb.	2.50
Strontium (Metallic), per gm.	.60
Tantallum—(Metallic) per gram	9.00
Telurium—(Metallic) per lb.	5.00
Thallium—(Metallic) per gram.	.25
Titanium—(Metallic) per gram.	2.25
Thorium—(Metallic) per gram.	17.00
Tungsten—(Metallic) per oz.	2.25
Uranium—(Metallic), per lb.	5.00
Vanadium—(Metallic), per gm.	22.00
Yttrium—(Metallic), per gram.	9.00
Zirconium—(Metallic), per oz.	65.00

BUILDING MATERIAL.

Bricks—Pale, ₱ 1,000	3 25@3.50
Bricks—Jerseys, ₱ 1,000	5.50@6.50
Bricks—Up Rivers, ₱ 1000	6 00@6.50
Bricks—Haverstraw seconds, ₱ 1000	6.25@6.50
Bricks—Haverstraw firsts ₱ 1,000	6.50@7.00
Bricks—Fronts, nominal, ₱ 1000, Croton	14.00@16.00
Bricks—Wilmington	20.00@21.00
Bricks—Philadelphia	@22.00
Bricks—Trenton	@22.00
Bricks—Baltimore	
Building Stone—Amherst freestone, ₱ cu. ft.	95@1.00
Building Stone—Brownstone, ₱ cu. ft.	1.00@1.35
Building Stone—Granite, rough, ₱ cu.ft	45@1.25
Building Stone—Granite, Scotch ₱ cu ft.	1.00@1.15
Cement—Rosendale, ₱ bbl	.85@1.10
Cement—Portland, American, ₱ bbl.	2 15@2.45
Cement—Portland, foreign, ₱ bbl.	2.30@2.40
Cement—Portland, " special brands.	2.45@2.75
Cement—Roman, ₱ bbl.	2.65@2.85
Cement—Keene's coarse, ₱ bbl.	4.50@5.50
Cement—Keene's fine, ₱ bbl.	7.00@8.25
Slate—Purple and green roofing, ₱ 100 ft.	7.00@7.50
Slate—Red roofing, ₱ 100 sq. ft.	12.00
Slate—Black, roofing, ₱ 100 sq. ft.	4.25@5.50
Lime—Rockland, common ₱ bbl.	1.00
Lime—Rockland, finishing, ₱ bbl.	1.20
Lime—St. John, com. and finish, ₱ bbl.	.90@.95
Lime—Glens Falls, com. and fin., ₱ bbl.	.85@1.10
Labor—Ordinary, ₱ day	1.50@2.00
Labor—Masons, ₱ day	4.00
Labor—Plasterers, ₱ day	4.00
Labor—Carpenters, ₱ day	3.50
Labor—Plumbers, ₱ day	3.50
Labor—Painters, ₱ day	2.50@3.50
Labor—Stonesetters, ₱ day	3.50@4.00
Labor—Tilelayers, ₱ day	3.50@4.50
Labor—Bricklayers, ₱ day	4 00

THE ENGINEERING AND MINING JOURNAL will thank any one who will indicate any other articles which might with advantage be quoted in these tables or who will correct any errors which may be found in these quotations.